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# METHODS FOR ESTIMATING THE DEGREE OF SYMPATHETIC VASOCONSTRICTION IN PERIPHERAL VASCULAR DISEASES*

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IT is now well recognized that the peripheral vascular diseases constitute a group which includes several distinct entities. In any given case, therefore, it becomes essential that a thorough study be made to define the condition as clearly as our present knowledge allows. This necessitates a more than passing interest on the part of the physician. He must be prepared to carry out a detailed, careful examination to get as much information as he can through the ordinary methods of physical examination. But for the more particular study of the circulation some special equipment is necessary; and a *set of standard normal reactions* with which to compare the pathological variations.

It is well to consider briefly the anatomy of the vascular and nervous systems in relation to the distribution of blood in the extremities. The main arterial vessels progressively diminish in calibre all the way to the periphery, thus partly compensating for every ramification in order to maintain a constant head of pressure in their channels. The mechanism for this is so successful that not only is the pressure held up but it gives even higher readings in the more distal main arteries than in the larger proximal ones. The differential pressures noted in simultaneous studies on the principal arteries form a fascinating problem in physics[1]. The hydrostatic pressure of the column of blood is also of considerable moment when an individual assumes an erect posture or allows the limbs to hang dependent. (Fig. 1.) As the tributaries divide into finer and finer subdivisions there arises a dense arteriolar network of peripherally distributed vessels. This subpapillary vascular plexus is of prime importance. From it, the capillaries run up into the papillae of the skin and determine its color by the oxygenation, stasis, or absence of blood in them as revealed through the overlying epidermis.

The sympathetic vasoconstrictor nerves (Fig. 2) leave the spinal cord through the anterior roots and pass by way of the white rami to the sympathetic ganglia. Here they either end or run through other ganglia to finally emerge as gray rami and to rejoin the spinal nerves with which they run to the periphery. All the way down there are branches given off segmentally to the arteries, the sympathetics coursing in the adventitial layer along the main vessels and receiving additions at different levels. The subpapillary arterioles get an abundant supply of these nerves in the general separation of the filaments from the spinal nerves. There is evidence that these sympathetic nerves are reflexly influenced by all sorts of stimuli coming into a vasomotor center high up in the central nervous system: and that local stimuli may set up more distal reflex pathways. The importance of these sympathetic vasoconstrictors cannot be overestimated. They act as stopcocks to control circulation of blood in the more delicate arterioles and capillary junctions. Through their action the surface temperature of the skin is largely regulated within physiological limits.

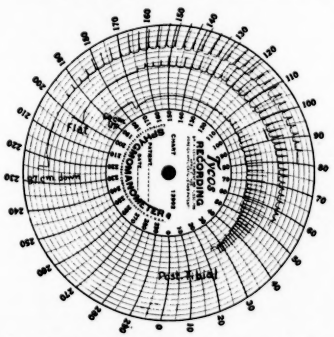


FIG. 1. Blood pressure records on the posterior tibial artery near the ankle. The marked increase in pressure due to hanging the leg over the edge of the table is well shown,—the variation being from the level systolic reading of 168 to the dependent reading of 210.

The surface temperature of the skin is the resultant of several factors as the supply of heat from the subcutaneous tissues, and the loss of heat from the surface by radiation, conduction and the vaporization of water[2]. The body temperature deep in remains remarkably constant but the surface temperatures show a consider-

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able variation in different regions and under a variety of conditions. The temperature of the surrounding air is of importance as well as vaporization of water from the surface; and the cooling effects of air currents must be taken into consideration. The surface temperatures vary greatly in different areas when taken at lower ranges of air temperature but as the higher room temperatures are reached the variations become much less; so that on very hot days the surface temperatures of the body show such slight changes as to be of little practical value. Under ordinary circumstances if an individual is exposed for any length of time to a given room temperature there may be several degrees centigrade difference between the maximum and minimum surface readings. And the fluctuations over a period of time when surface temperatures are taken daily make it extremely hazardous to say exactly what the normal surface temperature for any part of the skin surface really is. In individuals with normal vessels although there may be fluctuations from hour to hour or from day to day, comparative measurements on symmetrical points on the two sides are seldom constantly more than 1° C. (1.8° F.) apart[3]. The sole of the foot regularly has a surface temperature reading higher than the under surface of the great toe by 3° to 8° C. But in general the mean temperatures of the cutaneous surface show fairly close correspondence except at the periphery of the limbs, over fat pads which are poor conductors of heat, and in places where there are thick calluses. The effects of varying room temperatures have been briefly alluded to. Several studies have already been recorded in the literature on this factor and a formula deduced so that corrections can be made for these conditions. Vincent[4] found a constant of 0.3 (0.54° F.) to be added for each degree centigrade of air temperature. This was practically identical with the figure given by Reichenbach and Heymann[5] derived by the method of least squares. Cobet[6] accepts these constants as reliable in his extensive study of surface temperatures. Under these circumstances unless a constant temperature room is available, which is not practical if studies are being made in the operating room, the figures obtained should be corrected for this factor. In order to reduce our own figures to the same scale it has been necessary to do this. The earlier records were obtained mostly in the operating room and varied rather widely between 22° C. (71.6° F.) and 26° C. (78.8° F.) though efforts were made to maintain the room temperature as nearly 23° C. (73.4° F.) as possible; whereas the later surface temperatures for establishment of standards were measured in a constant temperature room at approximately 20° C. (68° F.). There is also a factor of importance in the rapidity in response of the instrument used for determination of the temperatures. All of our earlier observations were made with the apparatus described by Benedict[2] and manufactured by Collins. In this type of instrument at our disposal there was a lag so that a "building up" in surface temperature undoubtedly occurred to some extent, though in no way comparable to the "skin-felt" thermometry of Ipsen[3]. An improvement in making a more easily handled, compact, and rapidly responding skin thermometer described by Scott[7], has made it possible to do away with these differences. In recording observations on surface temperatures it would seem essential to take note at least of the room temperature, and time required to make each reading with the type of instrument used. Our standard conditions require that the subject be kept at rest, recumbent, for a minimum period of twenty minutes with the cutaneous surfaces exposed before the skin temperatures have any stability or significance. Benedict[2] states that it may require one and one-half hours after exposure to a constant room temperature for the surface temperature to reach a final equilibrium. For practical purposes we have found twenty to thirty minutes sufficient to adjust for the grosser physical

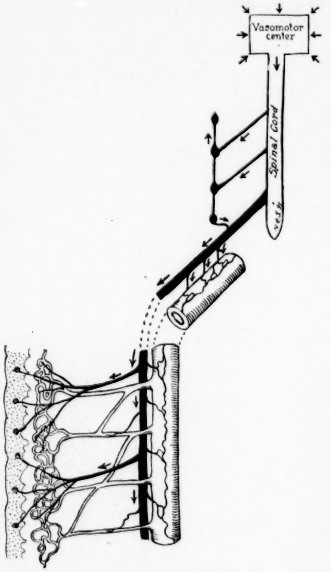


FIG. 2. Schematic representation of the sympathetic vasoconstrictor mechanism in relation to the arterial tree. The segmental distribution of fibers and the supply to the subpapillary arteriolar network are indicated. The capillary loops which run up into the papillae of the skin from this network are not shown.

changes. Reflex or psychic phenomena may cause rapid fluctuation in the skin temperature at any time due to vasomotor changes. With all this variation in the normal under so many different conditions, how then do surface temperatures have any value to us in the study of vascular diseases?

As has been previously stated, a constant difference of more than 1° C. (1.8° F.) between symmetrically compared areas may have qualitative value. It allows us to conclude that there is a circulatory difference as compared to the corresponding region on the other side. But it gives no idea of the amount of vascular disturbance as will be described later, nor does it even indicate which side is pathological. *The chief value of surface temperature determinations, however, consists in following their response to certain procedures which normally affect the vasomotor activity in the extremity.* Accordingly it seemed to us to be of the first moment to establish *the quantitative as well as the qualitative response in individuals with normal peripheral arteries* in order to secure a standard with which to compare pathological variations.

A consideration of the sympathetic nerve pathways makes it evident that the sympathetic vasoconstrictor nerves may be influenced at a number of different levels. The literature in fact abounds in references to previous investigations on the effect of various attacks on the sympathetic vasoconstrictors. Much of our knowledge of their pathways has been derived from these experiments. We had the opportunity, therefore, to test known procedures for their general, regional, and local effects on the sympathetic vasoconstrictor nerves.

The general, non-specific response to foreign protein has long been used in medicine in the treatment of arthritis and many other conditions. Brown[8] deserves the credit for its introduction as a test for sympathetic vasoconstriction in the extremities. The comparative rise in the surface temperatures of the extremities and their individual digits was balanced against the general temperature rise in the natural orifices of the body. This ratio indicated the relative amount of vasospasm present. The reaction was used not only as a diagnostic measure but for treatment as well and some interesting data were accumulated especially by Allen and Smithwick[9]. The patients were often miserable with the fever, chills and malaise of the general reaction and the test was not without its dangers. In addition to this it was a poor indication of the quantitative response inasmuch as neither the local nor general temperatures (which were being compared) were fixed.

Surgeons have known for a long time that there is a widespread surface vasodilatation under general anesthesia. For this reason extra precautions have been taken to prevent too rapid heat loss from this source. A study was made of several different anesthetics in a group of patients undergoing operation for various surgical conditions such as hernias, interval appendicitis, etc. The blood vessels were normal in these patients so far as could be determined by the ordinary clinical examination. It was found that although the surface temperatures were at quite different levels in different parts of the body, under nitrous oxide-oxygen anesthesia, there was a release of vasoconstriction; and all surface temperatures rose to approximately the same maximum where they remained for a time. In some places the response was not so rapid, notably over the sole where the skin was thickened and heat conduction slower but even this area reached the level finally. It was further demonstrated that unless complete relaxation and loss of consciousness were attained, the vasoconstriction was not abolished, the surface temperatures sometimes even dropping if the patient struggled. Upon the addition of ether with subsequent muscular relaxation, the surface temperatures quickly rose to their maximum and remained there. Furthermore, when once the maximum temperature had been reached, the addition of another anesthetic agent did not affect it further, indicating that there was no residual unaffected vasoconstriction. The maximum surface temperatures were usually registered within twenty minutes of the attainment of a satisfactory anesthesia. Nitrous oxide-oxygen alone was sufficient in many cases. In some, however, it was convenient to add ether to facilitate complete relaxation. Similar results were obtained with ether alone; and with tribromethanol. Charts showing these effects have been previously published[20]. Qualitative studies on the effects of inhalation anesthetics had been previously reported by Ipsen[10] and Foged[11].

Spinal anesthesia gave identical responses in the rise in surface temperatures on normal blood vessels. A maximum temperature was reached by all the cutaneous areas which were under the influence of the anesthetic. Areas of skin not in the anesthetized field did not respond in this manner. There was sometimes even an indication of augmentation of normal vasoconstriction. If the anesthetic spread upward to involve these higher cutaneous areas later, the surface temperatures rose on release of their vasoconstricting mechanism. The maximum surface temperatures of the lower extremities recorded in twenty-two individuals under the influence of spinal anesthesia were consistently close, there being only a narrow band of variation each side of the mean. There were three exceptions noted when dealing with spinal anesthesia and normal vessels. These will be discussed later. When once the maximum surface temperature changes had been registered under

spinal anesthesia, the addition of an inhalation anesthetic like nitrous-oxide-oxygen did not cause a further surface temperature rise. Charts illustrating these points were published previously[19]. While these experiments with spinal anesthesia were in progress, similar studies were being carried out on a qualitative basis by White[12], and Brill and Lawrence[13]. White[12] furthermore showed that by directly blocking the sympathetic ganglia through paravertebral procaine injections he could abolish the pain and get an indication of the presence of vasoconstriction. The same effects were also observed when the sciatic nerve was blocked.

These methods for estimating vasoconstrictor spasm were adequate for a study of patients in the hospital but when it came to an application in offices and in the out-patient department they were impractical. Consequently a simpler test was devised which permitted ambulatory management of the patients. Many investigators have noted that on anesthetizing the main nerve trunks, there is a rise in the surface temperature of the cutaneous area supplied with sensation by these nerves. S. Weir Mitchell[14] froze his own ulnar nerve and made a careful record of the rise in the surface temperatures in the anesthetized area in his hand. He refers to analogous experiments by Waller; Braun[15], Wiedhopf[16], Lewis and Landis[17], Smithwick and White[18] and others have reported similar phenomena. We have made application of these facts to a study of the normal sympathetic vasoconstrictors in the extremities. The posterior tibial nerve was anesthetized with 1% procaine in seventeen medical students. The nerve is easily palpated below the internal malleolus behind the posterior tibial artery. Lower down the artery crosses over it. It is only necessary to fix the nerve in position with the index finger to prevent it from slipping to one side. Then 10 cc. of a 1% solution of procaine is introduced through the fascia surrounding the compartment in which the nerve courses. It is not necessary to actually infiltrate the nerve. Within a period of ten minutes a sensation of heat radiating from the toes can be perceived. Wiedhopf[16] particularly stresses this phenomenon as evidence that vasoconstrictor fibers in a nerve trunk are more susceptible to the effects of procaine anesthesia than the motor or sensory fibers. This is followed shortly afterward by a numbness and paresthesia in the sensory distribution; and occasionally motor weakness of the short flexors. The vasoconstrictors are released; and the increased warmth limited to anesthetized skin is easily felt. Usually a red flush and a fullness of the cutaneous veins indicate the increase in the circulation of the involved area. The surface temperatures in the anesthetic zone rise quickly, and stay at a high level for over an hour after which the anesthesia wears off and the surface temperatures return to their previous level. This test gives information on the heel, sole and plantar surfaces of the toes but not on the dorsum of the foot. For practical purposes, however, it is all that is necessary. In the hands, the median nerve, the ulnar nerve, or both may be temporarily blocked in a similar fashion. The response in every instance gives the same form of curve as is seen when vasoconstriction is released by general or spinal anesthesia. The maximum attained was, after allowance for room temperature differences, but 1° C. below the maximum for the other agents. It was known that the trunk arteries still retained their vasoconstriction, perhaps thus accounting for the difference by limitation of blood volume available. When opportunities arose to allow tests for this it proved to be so.

From these experiments on normal blood vessels we have established the *normal qualitative and quantitative sympathetic vasoconstrictor mechanism* which operates on the peripheral arterial system. It has been done for general, spinal, and conduction block anesthesia. The surface temperatures of the extremities with normal vessels give a wide range of variation under ordinary conditions. A fluctuation over a range of 6° C. was registered in our observations of the initial temperature levels in twenty-two subjects. When, however, the vasoconstrictor influence was released either by general anesthesia, spinal anesthesia or conduction block of a peripheral nerve trunk with procaine, there was a *surprisingly constant type of response.* The surface temperatures in every instance rose sharply in the same form of curve to a height which showed a remarkably slight amount of variation. When corrections for different room temperatures were made it was found that under general and spinal anesthesia the surface temperature varied but little from the mean figure, the band being quite narrow. Conduction block anesthesia for the feet, according to our method, provide a good index for determining peripheral vasoconstriction. There was evidence of a slight degree of vasoconstriction still present, probably in the main vessels. By causing a complete paralysis by other anesthetics after conduction block had been previously carried out, there was a further rise in surface temperatures of about 0.7° C. This would indicate that in doubtful or borderline cases, the conduction block anesthesia, usually so convenient, should be supplemented by the other methods described. From these studies we have concluded that there is a maximum vasodilatation response for normal vessels. It has been designated "*the normal vasodilatation level*[19]". The lower limit of this level for the surface temperature of the great toe whose vasoconstrictors have been released by general or spinal anesthesia is 31.5° C. (88.7° F.) at a room temperature of 20° C. (68° F.); for conduction block anesthesia of the posterior tibial nerve, it

is 30.5° C. (86.9° F.). (Fig. 3.) We have adopted 20° C. as the standard temperature at which the constant temperature room is kept. All our figures have been recorded in these terms. According to Reichenbach and Heymann's formula a correction of 0.3° should be made for every degree centigrade by which the room temperature varies from this standard room temperature.

The importance of establishing the normal vasodilatation level consists in the fact that it gives us a standard with which to compare abnormal reactions. It enables us to decide that the responses are not only abnormal, but it also allows us to say in how far they miss attaining normal reactions. It would be extremely difficult in some cases of the mixed group to conclude which extremity was more in danger if we had to rely simply on the rises in surface temperatures given by any method of testing. Only when we can definitely compare the level to which the surface temperature does rise with that to which it should rise if it were normal, is there any rational basis on which to make a judgment. It seems fair to assume that the surface temperatures should reach the lowest limits of the normal vasodilatation level in a given case when the sympathetic vasoconstriction is removed by a known procedure unless there is something wrong with the circulation. If the maximum surface temperature recorded under these conditions is subtracted from the lowest limits of the normal vasodilatation level, an index of the amount of circulatory occlusion is given. This difference is the measure of the amount of organic occlusion, "*the occlusion index*". Our interest in surface temperature readings is not in how many degrees the surface temperature rises after the vasoconstrictors are paralyzed. This in itself may be of little importance. The rise may be marked and yet not approach the normal vasodilatation level. From our standpoint it is far more essential to determine how near the surface temperature rise comes to the lower limits of the normal vasodilatation level. (Fig. 4.) (Fig. 5.) It has been found in this study of normal vessels that

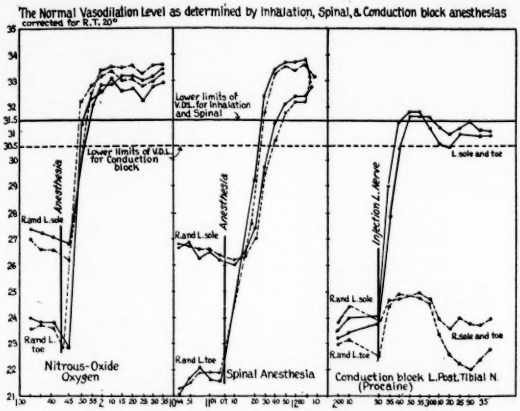
The Normal Vasodilation Level as determined by Inhalation, Spinal, & Conduction block anesthesias
corrected for R.T. 20°
Lower limits of V.D.L. for Inhalation and Spinal
Lower limits of V.D.L. for Conduction block
Anesthesia
Anesthesia
Injection L. Nerve
R. and L. sole
R. and L. toe
L. sole and toe
R. sole and toe
Nitrous-Oxide Oxygen
Spinal Anesthesia
Conduction block L. Post. Tibial N. (Procaine)

FIG. 3. When vasoconstriction in the extremity is released by known procedures, surface temperatures register at a higher level. The curves following such procedures are very similar. The lower limits for these surface temperature readings have been determined on patients with clinically normal blood vessels, and designated the "normal vasodilatation level".

there is a varying vasomotor activity in different parts of the body. Most of the surface readings are fairly close to the normal vasodilatation level but in the extremities there is a normally acting *vasoconstrictor gradient* which increases peripherally so that the digits represent the coldest areas on the body surface. The normally exposed hands show less of this gradient than the normally covered feet, but it can be brought out. In the lower limb the gradient usually starts a little below the knee. When the vasoconstrictors are paralyzed all surface temperature readings tend to quickly approach the normal vasodilatation level, making it necessary for some surfaces to change through several more degrees than others. Paralysis of the sympathetic vasoconstrictor nerves obliterates the normal vasoconstrictor gradient bringing all surface temperature readings to the normal vasodilatation level.

There are several precautions which it is necessary to observe in order to get acceptable surface temperature records. In the first place, the cutaneous surfaces should be exposed for some time in order to make sure that vasocon-

striction is shown. It is occasionally necessary to accentuate this as by a cooler room temperature, though the introduction of a hypodermic needle usually produces such an effect. Next, the apparatus should record quickly so that

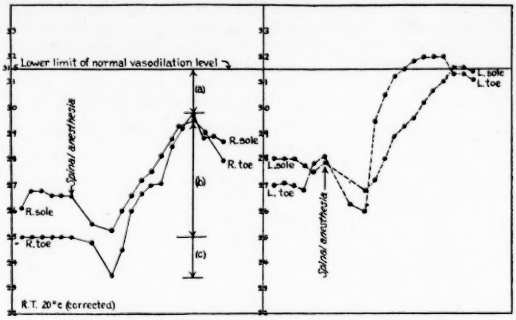


FIG. 4. In this patient the peripheral vessels showed no pulsation on the right but it was definite on the left. Under spinal anesthesia there was a sharp rise on the right, (b) or (c) (depending on which reading is regarded as the base line) but the temperatures failed to reach the normal vasodilatation level by a considerable amount (a). The temperature on the left side barely reached the normal vasodilatation level. We regard (a) as more significant than (b) or (c). The right side shows a mixture of occlusion and spasm.

there may be no building up of temperature under it by preventing escape of radiating heat. Thirdly, the agent used to procure vasoconstrictor paralysis must be efficient, partial anesthesia not giving satisfactory results. Lastly, the presence of scars or calluses may prevent accurate

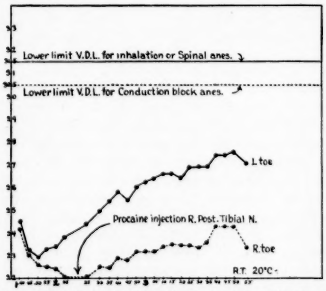
Lower limit V.D.L. for inhalation or Spinal anes.
Lower limit V.D.L. for Conduction block anes.
L. toe
Procaine injection R. Post. Tibial N.
R. toe
R.T. 20°C

FIG. 5. Although procaine block of the right posterior tibial nerve was not followed by a rise in surface temperatures on the right toe, the left toe which had nothing done to it shows quite a significant rise in surface temperature. This rise in itself means nothing as it falls in the range of normal variation.

surface temperature determinations by mechanical interference with the circulation or by hindering heat conduction in the area. Patients with fever have apparently already lost peripheral vasoconstriction. Local infection in a part may also invalidate surface temperature readings. In one type of patient with normal blood vessels it was found that there was an exception to the general rule. Three such patients had advanced carcinoma and cachexia. Palliative operations for relief of obstruction were carried out under spinal anesthesia. In every instance, the surface temperature readings started much higher than those usually noted, and after the spinal anesthesia was given, there was no rise to the vasodilatation level but rather the temperatures remained as they were or there was a progressively slow fall, showing no vasoconstriction. This type of reaction under general anesthesia has been described by Ipsen as a sign of an unfavorable prognosis. (Ipsen's sign.) These cases lend support to his interpretation.

Three main types of arterial disease in the peripheral vessels are now recognized. This classification has been made on the basis of the physiological response to paralysis of the vasoconstrictor nerves. It may be possible to correlate it (ultimately) with the pathological picture as well but it is already correlated with the circulatory efficiency. The first group is one in which there may be no change in the vasoconstrictor gradient after tests, indicating an entire absence of vasospasm. This group includes the majority of cases of senile and diabetic arteriosclerosis. The condition is apparently one of occlusion alone. (Fig. 6.) But the mere presence of diabetes or arteriosclerosis does not signify that spasm is not an important element. The second group is one in which after tests the vasoconstrictor gradient is completely obliterated. The surface temperatures everywhere rise at least to the lower limits of the normal vasodilatation level, indicating an entire absence of occlusion. This group includes the majority of cases of mild Raynaud's disease*. It also includes a number of cases of traumatic and irritative lesions to the blood vessels which have received but scanty recognition

*The arterial spasm in Raynaud's disease is a complicated type of reaction, not caused solely by sympathetic activity but usually profoundly influenced by the latter. A study of such unusual vascular responses is being reported separately.

in the former confused ideas of classification. The early stages of thromboangiitis probably also fall in this class. The physiological response in this group is seemingly that of pure vascular spasm. (Fig. 7.) The third group

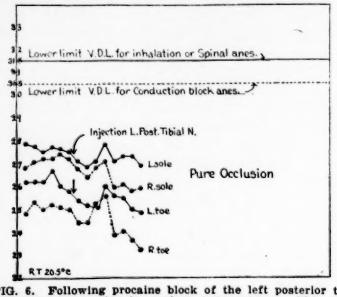


FIG. 6. Following procaine block of the left posterior tibial nerve there is no rise in surface temperatures. This is an instance of pure occlusion.

consists of a mixture of the first two with reactions indicating both occlusion and spasm in varying proportion, some cases showing more of one, others the reverse. (Fig. 8.) It includes

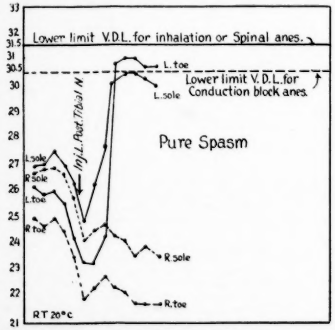


FIG. 7. After procaine block of the left posterior tibial nerve there is a marked rise in surface temperature on the left, the lower limits of the normal vasodilatation level being reached. This is an instance of pure spasm.

a majority of the presenile types of arterial disease such as thromboangiitis obliterans, in the stage in which we now most often see it. From the ordinary methods of physical examination even assisted by qualitative tests for vasoconstriction, it would be impossible to determine the relative amount of occlusion and spasm in this group. A schematic chart is presented which shows the response and the classification of these groups. The probable location of the pathological changes has also been included. (Fig. 9.) In cases of peripheral vascular disease application of tests should be made to determine the obliteration of the vasoconstrictor gradient, the nearness of approach to the normal vasodilatation level, and the occlusion index. It has been possible for us to recognize a sharp differentiation between cases of advanced non-inflammatory occlusion and those in which vasospasm is present. In the former it will be noted that some mechanism comes into play which compensates for the occlusion by the removal of all vasoconstriction from the anastomotic and terminal vessels. The surface temperatures in the terminal areas frequently record at a higher level than usual and we have not been able to demonstrate by tests any of the vasoconstriction usually present in normal cases. Attempts to improve the circulation in these cases by operation on the sympathetic nerves would seem to have no justification in this form of

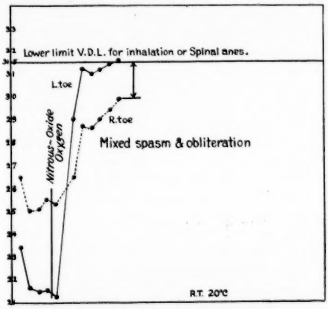


FIG. 8. Under nitrous-oxide-oxygen anesthesia, the surface temperatures on the right toe fail to reach the normal vasodilatation level. The left side appears to be normal. This is an instance of mixed occlusion and spasm.

arterial disease. In advanced stages of peripheral vascular disease dependent upon spasm, this compensatory mechanism does not come into play even though the vitality of the part may be seriously compromised. In mixed cases the relative amounts of spasm and occlusion can be determined by comparing the maximum surface temperatures reached after removal of the vasoconstrictor influence with the normal vasodilatation level. Intelligent therapy may then be instituted. This may call for permanent removal of vasoconstriction by operation; or for more conservative measures, depending on the general condition.

## CONCLUSIONS

In order to make satisfactory comparisons it is necessary to have a normal standard against which to read.

This has been established as the normal vasodilatation level in individuals with normal arteries.

The normal vasodilatation level is represented as the maximum surface temperature attained when all sympathetic vasoconstriction has been removed by appropriate measures in the area tested.

This normal vasodilatation level has been determined by the use of general anesthetics, by spinal anesthesia, and by conduction block of peripheral nerve trunks.

The lower limits of this level for general or spinal anesthesia at a room temperature of 20° C. (68° F.) is 31.5° C. (88.7° F.); for conduction block anesthesia it is 30.5° C. (86.9° F.).

A correction of 0.3° C. (0.54° F.) should be made for every degree centigrade variation in the room temperature from the standard.

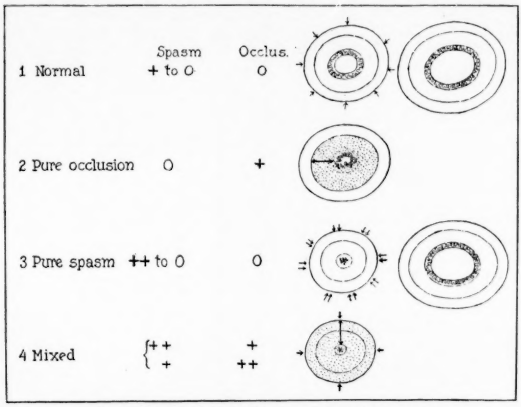


FIG. 9. Schema showing the types of peripheral vascular disease which can be grouped according to physiological response. The sites of the probable pathological lesions are also indicated.

Surface temperatures recorded without reference to a fixed standard have much less significance.

The number of degrees by which a given case fails to attain the lower limits of the normal vasodilatation level is of much more value in estimating the proportion of spasm and occlusion than the number of degrees through which the surface temperature rises.

This is a point of practical importance in the management and prognosis of many of the cases of common vascular diseases in the extremity.

It would seem desirable to obtain further data regarding the relation of age, time of year, nationality, and many physiological reactions to vasomotor responses. Such investigations are being conducted by us in the laboratories and clinic.

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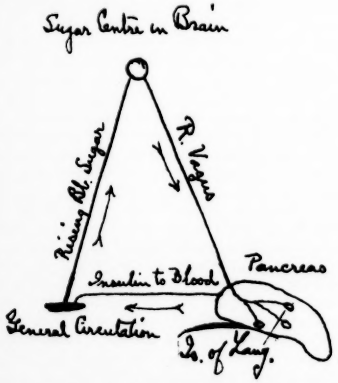
# IS DIABETES CAUSED BY PARALYSIS OF THE PANCREATIC FILAMENTS OF THE RIGHT VAGUS NERVE?

BY GEORGE H. TUTTLE, M.D.*

ACCEPTING as true the latest hypothesis of Macleod[1], founded upon the experiments of LaBarre, in so far as it relates to direct stimulation of the pancreatic insulin through certain filaments contained in the right vagus nerve; and, likewise, accepting the hypothesis that a rising blood sugar stimulates a sugar centre probably situated in the vagus nucleus of the brain, which sends nerve impulses through the right vagus to the islet cells of the pancreas; the author wishes to offer the further theory, based on these two hypotheses, that many primary diabetic states (excluding those due to definite endocrine influences) are caused by partial, or complete, paralysis of the vagal nerve filaments connecting the sugar centre with the Islands of Langerhans.




It is obvious that the hypotheses of Macleod do not aid us much in understanding the diabetic states of glycosuria, ketosis and coma. They rather make us wonder how such states can originate; they even make us wonder how diabetes can come into existence at all; for, in a slowly developing primary diabetes, if the slowly rising blood sugar stimulated an additional flow of insulin through vagus influences, then the diabetes, at its very beginning, before any pathology could have developed in the pancreas, would automatically cure itself and the disease would be impossible.

But if we imagine a break in this chain, such as a paralysis of the vagal filaments, then the picture of ordinary diabetes appears and under such conditions nothing else could develop. In ordinary cases the increasing blood sugar would stimulate the brain centre, but no impulse would be sent to the pancreas and no extra insulin would be discharged to neutralize the extra blood sugar so that the usual diabetic sequence of glycosuria, ketosis and coma would develop in due time. Such is the theory which I offer to explain the diabetic state in many cases. The reasons for such an opinion will gradually appear.

Macleod has stated the physiological truth that excessive stimulation never causes degeneration of organs; hypertrophy usually results. It is evident, then, that long-continued stimulation of the islet cells by impulses from the sugar centre cannot cause degeneration. But paralysis frequently produces atrophy and degeneration of an end organ. If the islet cells were only stimulated by nerve influence, under my hypothesis, there would be extensive degeneration of cells, which there is not. These cells, however, are also subject to humoral stimulation and this saves them, even in long-continued cases of diabetes. The question of degeneration of the islet cells has been practically disposed of by the pathologists and Shields Warren[2], in his late work on the "Pathology of Diabetes", finds that in severe cases in children there is seldom any degeneration of the islet cells.

It will, perhaps, be asked, how is this paralysis of the vagus filaments brought about? To explain this, another truth of physiology must be invoked. Any long-continued overstimulation of a nerve will produce paralysis of that nerve. Such a condition exists in the ordinary diabetes due to overfeeding. The long-continued high blood sugar, lasting for months or years, perpetually excites the sugar centre, which, in turn, overstimulates the vagus filaments until partial or complete paralysis results. At first, and for a long time, the overstimulation by the superabundant diet causes the outflow of extra-pancreatic insulin and the condition automatically takes care of itself, but later fatigue and, finally, paralysis occur, and the diabetic state results. Now the following picture is seen: a perfectly normal pancreas, producing a normal amount of insulin, which can only be discharged by humoral stimuli following the ingestion of food. When this amount of insulin is insufficient to take care of the food ingested, the blood sugar rises above normal, but this can no longer call for additional insulin by stimulation of the brain centre because the nerve filaments of the vagus going to the pancreas are paralyzed.

Let us review our clinical knowledge of dia-

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betes. We see that the cases are mild, moderate, or severe. If the theory is sound, in mild cases there will be only fatigue of the nerve; in moderate cases a paralysis, but one capable of recovery in time; and in severe cases, an absolute paralysis without hope of recovery. These states parallel those seen in paralysis following cerebral hemorrhage. In our clinical treatment we find more evidence of these three states. In mild cases, if the patient is properly treated and obeys orders, he will first be restored to normal with sugar-free urine by diet, and then, as more food is gradually added, his tolerance will slowly increase as the vagal filaments recover from fatigue. In moderate diabetes insulin must be used as well as dietary control. In a recent case following a surgical operation a patient left the hospital on 65 units of insulin daily. By gradual reductions, less and less insulin was required and at the end of four months none at all was necessary to keep the patient sugar-free. If we suppose this case to have been one of paralysis, but capable of complete restoration of function, the facts would correspond with the hypothesis.

Now let us consider an acknowledged severe case, needing 75 units of insulin daily. Such patients, if given insulin for years, will never gain one iota of tolerance and probably will lose tolerance. These cases represent complete paralysis of the vagal filaments, according to the hypothesis, without hope of recovery; and in these cases our pathologists find no pancreatic lesions which cannot be explained as a result of the disease rather than the cause of it; in children, nothing at all appears in the way of pathology in the pancreas.

Our clinical experience, then, corresponds with our theory and the method of treatment need not vary at all from that at present. We should realize, however, that, instead of resting the cells of the islets, we are really resting the filaments of the vagus, in the hope that they may recover from the paralysis affecting them. This theory applies only to the control of the pancreatic insulin and in no way lessens my belief in the existence of an extra-pancreatic (or cellular) insulin.

To complete the picture which exists after the neurogenic control of the pancreas has been lost through paralysis of the vagal filaments, it is necessary to understand the humoral control of the activities of that organ. In a previous article the writer has expressed his opinion that such a humoral control exists and is chiefly exerted by the hormone secretin[3]. Laughton and Macallum[4] quite recently have experimentally proved that there are certain substances found in extracts of the duodenal mucosa which have a specific effect in directly stimulating the cells of the Islands of Langerhans. In his early experiments Banting frequently used injections of secretin to cause a flow of insulin from the pancreas and it could be continued to the point of complete exhaustion of the supply. Many others have noticed that if secretin be injected shortly before a meal, when the blood sugar is normal, a severe hypoglycaemia may be produced. These evidences definitely point to a humoral control of the pancreatic insulin, but it must be realized that such stimulation of insulin can only occur following a meal, since the acid contents of the stomach, flowing into the duodenum, are necessary to excite the activity of secretin. It follows that in all postabsorptive periods, especially between supper and breakfast, the blood sugar in diabetics rises above normal without any means, either neurogenic or humoral, of calling forth more pancreatic insulin to modify this condition.

Realizing, then, these two ways in which an additional supply of pancreatic insulin may be added to the blood in the natural course of metabolism, do they suggest anything which might be of value in the treatment of diabetic cases? It seems to the writer that secretin may become a most valuable adjunct to our treatment in both mild and severe diabetes, if it can be purified and standardized for use by injection, and probably by mouth. In mild cases we need only a little more insulin from the pancreas to make the metabolism normal. Can we not get it with secretin by humoral stimulation of the pancreas, which pathologists tell us always has plenty of healthy Islands of Langerhans?

Theoretically, we ought to get great aid from secretin in coma. Remember that in cases of acute coma, the pathologists find an almost normal pancreas, capable, if stimulated, of producing immediately a large supply of fresh, potent insulin to counteract the acidosis and severe hyperglycaemia of the coma state. Is not secretin the natural and perhaps ideal agent to produce this result?

Conversely, speaking in terms of blood sugar, it is evident that a perfect machine such as the human organism in health must have a mechanism for raising, as well as for lowering it; and although not all of the details of such a mechanism have been absolutely proven by animal experimentation, enough is known to justify our conclusions. Claude Bernard showed that hyperglycaemia and glycosuria followed piqûre and hundreds of investigators have verified these facts. Brugsch, Dresel and Lewy[5], in 1920, detected two centres in the vagus nucleus of the brain the stimulation of which produced opposite effects on the blood sugar. One, by sending impulses through the vagus, stimulated a flow of pancreatic insulin and reduced the blood sugar. The other, by sending impulses through the sympathetic system, caused hyperglycaemia and glycosuria. Physiologists everywhere reported that if the distal end of the cut splanch-

nic nerve was stimulated, these same results were produced and they ascribed them to an increased production of epinephrine. Then it was found that epinephrine injected hypodermically produced the same results. We need, therefore, no further proof that this mechanism exists. But just as until recently, in the case of the vagal mechanism, we have not been able to show conclusively that a hypoglycaemic state of the blood sugar automatically stimulates this brain centre and starts the epinephrine mechanism, yet we have enough clinical evidence in insulin reactions to satisfy all but ultra-scientific minds. Death is possible in an insulin reaction perhaps once in 100,000 times, perhaps less often. A person will recover from such a reaction unaided in time. How would it be possible for the person to recover except by epinephrine mobilizing the glycogen stores of the tissues, when no glucose is ingested? In reactions severe enough to cause convulsions, lactic acid may be thrown out into the blood by the muscles, converted into glucose by the liver, and turned into the blood stream to relieve the hypoglycaemia; but in all other reactions less than convulsive, no other explanation than the one mentioned seems possible. Clinically, we already realize the truth of this theory and give epinephrine in insulin reactions routinely when oral glucose will not suffice.

This completes the picture of the various regulatory mechanisms used by Nature in controlling the rise and fall of the blood sugar, so far as pancreatic insulin and epinephrine are concerned, but there is still another influence in carbohydrate metabolism to be reckoned with which has yet been unstudied, namely "cellular insulin". This subject will be discussed in the next issue under the title of "Hyperinsulinism."

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# STUDIES IN ASTHMA

## XI.—The Immediate and Late Effects of Sensitization in Man*

BY ABRAHAM COLMES, M.D.†

LONG before the advent of our present concept of allergy, the older observers recognized the relationship between asthma, hay-fever, urticaria, eczema, and migraine, pointing out their familial tendencies and explaining their incidence on the basis of a peculiar diathesis. Today we have come to acknowledge the soundness of these observations, postulating heredity[1] as the dominating factor in the evolution of these diseases, and ascribing the occurrence of the clinical manifestations to sensitization[2].

As far as we know, sensitization is no different in man than it is in the experimental animal except that in the former the sensitizing substance gains entrance into the tissues through the respiratory and gastro-intestinal tracts and through contact with the skin, while in the latter it is injected parenterally. The result of this process, however, is apparently the same, as evidenced by the common occurrence of eosinophiles, positive skin tests and specific antibodies in the blood (anaphylactins[3] in the lower animal, reagins[4] in man). The clinical symptomatology (or anaphylaxis) resulting from a second exposure of the sensitized animal to the specific substance varies largely with the susceptibility and reactivity of the particular species.

In man the symptomatology resulting from second contact is varied, occurring in the form of asthma, urticaria, vasomotor rhinitis, eczema, migraine, et cetera, either singly or in conjunction with each other. The reason why certain individuals become sensitized while others remain non-sensitive can be best explained, in the light of our present knowledge, on the basis of a peculiar inheritance which follows the mendelian law[5]. Aside from this inheritance, such individuals are no different from the rest of mankind, since their tendencies to hypersensitiveness cannot be recognized until after sensitization has been accomplished and until the symptoms have been produced by subsequent contact with the offending allergen.

It is proper to assume, then, that sensitization is an abnormal immunologic process which occurs in certain individuals on the basis of an hereditary predisposition and that the *immediate* effect of this process is the appearance of eosinophilia and reagins in the blood, positive skin tests, and of various clinical manifestations which have been described as "The Clinical Characteristics of Hypersensitiveness[6]." The present object, however, is to bring out the fact that after sensitization is established, certain *late* effects occur.

In the early stages the patient's symptoms disappear when the specifically exciting factor is eliminated. Thus the baker sensitive to wheat loses his asthma with change of occupation. The child sensitive to egg gets rid of its eczema when eggs are omitted from the diet; the young woman

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sensitive to orris ceases to sneeze upon omission of face powder, etc. There are many instances, however, where the elimination of the primary exciting factor is not followed by the expected relief, and where the same symptoms appear to be provoked anew by a variety of unrelated causes. The following cases are illustrative:

CASE I—Miss M. G., aged 32, first seen in May 1930, had suffered from ragweed hay-fever since 1925. In 1927 and 1928 her symptoms continued for several weeks beyond the hay-fever season. Since August 1929 the sneezing had continued throughout the fall and winter and up to the spring of 1930. In her own words, "I sneeze day and night; am worse from contact with dust, all kinds of odors, from the least change of temperature, excitement and fatigue." Tests with various proteins gave positive reactions to ragweed, house dust, and a doubtful reaction to orris. Omission of orris and the adjustment of a dust-free room were followed by prompt relief of symptoms and now such non-specific agents as change in temperature, fatigue, and excitement no longer disturb her.

CASE II—Mr. S. C., aged 42, commenced to sneeze and cough during the winter 1927-1928. In April 1928 the cough became worse and soon after he began to wheeze. When first seen, in August 1928, he was sneezing, coughing, and wheezing almost constantly. For many years he had been a truckman, delivering flour from warehouses to various bakeries. He was worse when in contact with flour. In addition to this, however, dusts of all kinds and the odor of fried foods invariably brought on his symptoms. He could not tolerate gasoline smoke or changes of temperature. He perspired easily, had colds frequently, and felt extremely tired. Tests with various proteins gave marked reactions to wheat and a doubtful reaction to feathers. A two months' vacation from business, in addition to desensitization to wheat, was followed by marked amelioration of his symptoms. Six months later this patient was considered as clinically cured. He had resumed his occupation. The fatigue had left him; his colds did not recur, and, most striking of all, he was able to tolerate smoke and odors of all kinds with but mild discomfort.

CASE III—Miss R. J. had had an attack of urticaria at the age of thirteen, which at that time was diagnosed as due to milk. Omission of milk was followed by relief of symptoms. In August 1929, at the age of 20, following the death of a sister she had a nervous breakdown, on account of which she consumed large quantities of aspirin for a period of four months (up until Dec. 1929). In March 1930 she took an aspirin tablet and promptly broke out with hives all over the body. Since then the hives had persisted although no more aspirin was taken. She had grown decidedly nervous, slept poorly, and noticed that her catamenia, as well as excitement, brought out new crops of hives. Dietary adjustments did not seem to influence the symptoms. All tests with various proteins, by scratch method, gave "positive" reactions. Even a saline control test produced a wheal with surrounding erythema. A vacation, coupled with calcium therapy and general sedatives, resulted in a marked amelioration of her symptoms, which had evidently been prolonged by something other than the primary exciting factor.

In analyzing the course of the disease in these three patients, we feel justified in assuming that ragweed, house dust, and possibly orris in Case I, wheat in Case II, and aspirin in Case III were the immediate exciting factors as evidenced by the clinical history of exposure and presence of positive skin tests in Cases I and II. We note, however, that these patients responded with their characteristic symptoms to irritants which were non-specific (fatigue, change of temperature, excitement, worry, odors of all kinds, gasoline smoke, etc.) and unrelated to the primary exciting causes.

In an effort to explain these phenomena we must consider, in addition to the immunologic phase, also the mechanical aspect of the process of sensitization. We must realize that a foreign substance entering the circulation through delicate mucous membranes will leave a mark on them, especially if this offender occurs in large quantities and the exposure is frequent. While the response to the parenteral entrance of such substances is the mobilization of the immune forces in the body as a whole, yet, it is significant that the clinical symptoms, upon subsequent contacts, most often arise in the tissues which have stood the brunt of sensitization. Thus orris powder, pollens, or dusts, which sensitize through the respiratory tract, produce symptoms pertaining to the nose and bronchi in the form of vasomotor rhinitis, cough and asthma. Food substances, which sensitize through the digestive tract, most often are causative of abnormal gastro-intestinal symptoms or certain forms of skin lesions such as urticaria and eczema, the skin being easily sensitized through absorption of predigested proteins from the gastro-intestinal tract[7]; while allergens, which sensitize the skin through contact, produce local manifestations only, such as poison ivy and other contact dermatoses. It would seem reasonable to ascribe these phenomena, in part at least, to local trauma which results from the mechanics of sensitization, thus bearing out Freeman's[8] contention that a traumatized organ will often become the seat of allergic disease.

If the clinical symptoms due to hypersensitiveness are allowed to continue for any length of time, the affected tissues undergo certain local changes which become fixed and sometimes permanent. Thus as a result of constant sneezing, the nasal mucosa becomes edematous, boggy, loses its vascularity and secretes a tenacious liquid due to hyperactivity of its mucous glands. At the same time the nerve endings lodged in the mucous membranes become hyperirritable from constant contact with the exciting allergens, and the reflex (vasomotor rhinitis), which is at first elicited by the specific excitant, can now be provoked by non-specific factors as well. In addition, it is conceivable that a conditioned reflex establishes itself, whereby the affected individual responds with characteristic symptoms to any stimulation no matter how delicate. Thus the patient who first sneezes from contact with orris, later may sneeze from the smell of soap, fried foods, gasoline smoke, changes of temperature, all of which excitants are non-specific but bring on the same symptoms that primarily were dependent upon contact with the

specific allergen. The removal of the primary exciting factor, therefore, is not always followed by complete relief of symptoms.

Similar conditions may obtain in cases of allergic cough or asthma, in which instances, the pharynx and bronchial mucosa are the seats of primary sensitization. Here, also, we may get responses (cough and wheeze) to non-specific stimuli as referred to in the case of the sneezer. Again, a conditioned reflex may also play an important rôle here, as evidenced by Klewitz's[9] description of a tobacco-smoke asthmatic who had an attack of asthma while in the theatre watching a soldier light a cigarette on the screen, and the case cited by Wright[10] of a patient hypersensitive to roses who gets an attack of asthma from the sight of a painted rose.

In the case of urticaria from non-specific foods, overeating in general, or from excitement, it is reasonable to assume that the non-specific impulses transmitted to the local vasodilator nerves in the skin will bring about urticarial wheals, but only in the wake of a previous specific sensitization. One of our patients, who came in complaining of hives, refused to have skin tests (which he had at another hospital), stating that it was not food that caused his hives, but rather, nervousness. He stated, "You get me excited and I break out with hives in an instant." Recently Caulfield[11] reported a case where the intravenous injection of neosol (non-specific irritant) provoked localized urticaria at the site of previous ragweed inoculations.

An observation made by Brügelmann[12] in 1910 is worthy of mention here. He discovered that patients who suffer from seasonal hay-fever develop sensitive spots in the intranasal mucous membrane during the attack. This observation gives additional evidence of the local hyperirritability which results from contact with sensitizing substances, thereby permitting non-specific irritants to perpetuate the abnormal state.

To summarize the above observations we may say that symptoms which arise in a hypersensitive individual as a result of contact with specific allergens represent the immediate effects of sensitization, while similar symptoms resulting later on from exposure to non-specific irritants as well constitute the late effects of sensitization. It is proposed that the mechanism of the latter depends upon the establishment of conditioned reflexes as well as upon a physical hyperirritability of the tissues involved.

## COMMENT

This discussion has merit only in so far as it finds a useful clinical application. The allergic conception of certain diseases has often fallen into disrepute chiefly because a patient failed to obtain relief after the apparently exciting factor has been removed. While many of the causes for such failure have been previously pointed out[13, 14] the importance of conditioned reflexes and of local tissue hyperirritability have not been sufficiently stressed. The chronicity of the asthmatic state lends itself ideally to the establishment of the habit of coughing and wheezing at the least provocation. The same holds true of the chronic sneezer and urticaria sufferer. It is on this phase of allergic diseases that the psychogenic theory of asthma was founded. We may reiterate, however, that the first occurrence of the clinical symptoms of hypersensitiveness are always based upon a previous definite specific sensitization[15]. Although in many instances the primary exciting allergen may not be discovered and the presenting clinical picture may be entirely dominated by the secondary complications, yet to treat these complications without eliminating the primary cause of the disease is fallacious. Where the sensitizing substance cannot be discovered, if the patient is merely removed from his surroundings, he often leaves the offender behind him. Tissue irritability may then subside and the conditioned reflexes, in the absence of the specific stimulus, will gradually weaken and possibly disappear[16]. These various phases in the treatment of allergic diseases are gaining recognition. With the better understanding of their evolution there is no place for dogmatic stubbornness or for treatment of patients by procedures which rest entirely upon tradition. Due recognition must be given to those other methods[16, 17, 18, 19, 20, 21, 22] which, in the opinion of careful observers, have brought relief to a certain number of patients. As a result of one or two successful cases we are apt to generalize too freely and are, therefore, prone to apply the wrong method of treatment to any given patient. If, however, we give due consideration to all factors which enter into the causation of this chronic ailment, including the rôle which the psyche may play in it, we are then prepared to treat the individual patient more intelligently.

## SUMMARY

In the production of the manifestations of allergy we recognize two distinct phases:

(1) The period of the first occurrence of symptoms (whether it be asthma, hay-fever, or urticaria, etc.), which depend upon contact of the patient with the specific allergen, and constitute the immediate effects of sensitization.

(2) The period when non-specific irritants provoke similar symptoms, which depend chiefly upon a state of tissue hyperirritability and upon the establishment of conditioned reflexes and which constitute the late effects of sensitization.

Dr. F. M. Rackemann has read this manuscript and has made valuable suggestions, which are hereby gratefully acknowledged.

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# SCARLET FEVER IN CHINA*

## Some Impressions Concerning the Value of Serum Treatment in a Malignant Form of the Disease

BY A. A. WEECH, M.D.†

IN March of 1921 a pestilence appeared in the town of Yunnanfu, the capital of Yunnan province in southwest China, a pestilence which raged until May 1922 and did not abate until every man, woman and child had been afflicted and until one-fourth (50,000) of the entire population of 200,000 had succumbed. An account of this epidemic has been given by a French army physician, Dr. Mouillac[1], who was stationed in Yunnanfu during the latter part of this period. The description, both vivid and terrible, removes all doubt as to the nature of the malady responsible for so many deaths—scarlet fever. Dr. Mouillac tells us that, in the early part of the epidemic, the presence of white spots and patches of membrane throughout the pharynx led to the supposition that the disease was diphtheria and antitoxin was administered until the local supply was exhausted. He describes cases in children in whom death supervened within 24 hours and speaks of others in whom convulsions accompanied diarrhea of such severity as to lead certain English and Chinese doctors to diagnose cholera. Dr. Mouillac was fortunate in securing the services of a bacteriologist, Dr. La Font, Director of the Bacteriological Laboratory at Toukin, who reported a total absence of Klebs-Loeffler bacilli in the throats of those afflicted and the constant presence of streptococci, which were often found in pure culture.

It seems not out of place to open a discussion of scarlet fever in China by citing the Yunnan epidemic for, of all the diseases encountered in Peiping, this was the most sinister in its threat and terrible in its aspect. During the two years of my service at the Peiping Union Medical College, 51 cases of scarlet fever were received as hospital patients. Of these 13 died, a mortality of 25.5 per cent. The number is small, far too small for an accurate mortality rate, but sufficiently large to prove, even by rigid statistical methods, a real difference in the effect of this disease from that encountered in America. Other figures are obtained with difficulty, but Dr. John Grant of the Demonstration Public Health Unit has informed me that among 24 cases treated in the home by public health nurses there were 10 deaths, a mortality of nearly 42 per cent. My own experience with patients seen in consultation outside of the hospital would not improve these figures. Last winter the whole of the foreign population of Peiping was shocked to learn that an American military officer had lost his entire family, a wife and two children, within the space of a month and a half—victims of scarlet fever. If we analyze our hospital figures from the standpoint of age we find that all of the deaths occurred in persons under the age of 14 years. Of these there were 39, which gives a childhood mortality of 33.3 per cent.

Before proceeding further it may be well to refresh our minds concerning the malignant types of scarlet fever, for I shall use the terms *toxic* and *septic* in their stricter sense and not loosely, as is so often done. By toxic or hypertoxic scarlet we mean a form of the disease in which the prognosis appears grave within a matter of hours of the onset. In this type the fever rapidly climbs to hyperpyretic levels, vomiting is followed by convulsions, and soon the patient sinks into a state of coma, which is broken periodically by the occurrence of more convul-

*Remarks made before the staff and house officers of the Children's Hospital, Boston, at their weekly history meeting, January 23, 1931.

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sions. Diarrhea, mild or profuse, may appear. We soon came to recognize the early occurrence of diarrhea as of serious prognostic import. Strangely enough the throat symptoms are usually excessively mild and the skin eruption may be so evanescent as to escape observation altogether. Ker[2] refers to this type of the disease as "atoxic" when life continues for longer than a day and as "fulminant" when death occurs within 24 hours. He also refers to an "adynamic" form of toxic scarlatina in which circulatory collapse rather than neurological symptoms dominates the picture. I should also like to note the occurrence of acidosis in association with toxic scarlatina, a symptom which we observed 3 times, once with a $CO_2$ combining power as low as 16 volumes per cent. Of the nature of this acidosis I know nothing except that it is probably not an acetone-body disturbance for the blood sugar remains at a normal level, and that in one instance it was relieved by the administration of sodium bicarbonate.

By septic scarlet fever we mean a type of the disease which becomes unusually severe because of the development of so-called septic complications, lesions which arise as a result of the severity of the throat symptoms and from a direct extension of hemolytic streptococci from the throat to the lymph nodes, upper nasal passages and accessory nasal sinuses, the middle ear and mastoids and finally to the blood stream. In these cases the tonsils soon become covered with grayish-white spots, which extend and coalesce, giving the appearance of a true diphtheritic membrane. Prior to going to China, I had been taught that membrane which wandered from the tonsils was presumptively diphtheritic in origin. In these cases the membrane was rarely confined to the tonsils but spread to the posterior pharynx, palate, uvula and probably far into the nasal passages. So strongly did the appearance suggest the presence of diphtheria as a complication that in many instances we felt compelled to administer antitoxin, but in not a single case were we able to isolate the bacilli of Klebs and Loeffler. The extension of this membrane was frequently followed by necrosis and we have observed deep ulcers with tonsils or uvula sloughing away and on one occasion palatal perforation into the upper nasal passage. I may also note the occurrence of palatal paralysis with absence of the palatal reflex, nasal voice and food regurgitation through the nose. At necropsy in these cases the tissues were deeply infiltrated with pus cells and collections of pus cells and streptococci lined the course of the smaller nerves, but diphtheria bacilli were never found either in stained sections or by culture. Coincident with the extension of inflammation to the nose, the fever rises even higher and a profuse sero-sanguineous discharge of extremely foul odor makes its appearance. This discharge literally pours from the nose. To provide even approximately satisfactory drainage we have employed special nurses who remained constantly at the bedside armed with a rubber catheter connected with suction and by aspiration removed the excretion as rapidly as it appeared. Necropsy usually discloses involvement of all the accessory nasal sinuses and sometimes extension through the ethmoid to the base of the brain. While this process is going on, the lymph-nodes of the neck become increasingly engorged and sooner or later involvement of the middle ear and mastoids makes its appearance. Blood cultures, positive for hemolytic streptococci, may be obtained at any time during this period and are nearly always positive at postmortem puncture.

In summary it is well to remember that toxic scarlatina is toxic from the time of onset, but that the manifestations of the septic type do not appear until some days have elapsed. In Peiping we found it necessary to regard *every case* as potentially septic regardless of the mild appearance at onset.

In view of the high virulence of the Chinese brand of scarlet fever, it would seem that there, better than anywhere else, could the worth of serum in treatment be evaluated. From a statistical standpoint this has not been easy as many of the patients are brought to the hospital for treatment because of the development of septic complications, which usually do not appear until after the third day of illness. Regarding the effectiveness of serum treatment in other parts of the world, there is general agreement that it should be administered early. Personally I confess to considerable weariness over this limitation, for many years must elapse before the people of China can learn the value of immediate medical advice and in the meantime countless patients will appear before our modern physicians who are supposed to be satisfied with some such complacent statement as "you should have come to see me sooner". Certainly our experience leads us to believe that antiscarlatinal serum is of little more value than so much distilled water after a case has once become septic. Figures 1 and 2 will illustrate this. In the second case illustrated, the sudden temperature fall following the intravenous administration of serum, and the almost immediate subsequent rise, raises in our minds a question concerning the real significance of such a drop in patients who are supposed to have benefited by serum treatment.

It would be well if we could analyze our cases satisfactorily on a mortality basis, comparing those who were given serum early—and by early I mean on or before the third day—and those who were not given serum. Unfortunately such a classification would not result in a fair division of cases. The patients whom we saw early were invariably staff members, or their children, who were removed to the hospital at once for

purposes of quarantine. As a group we would expect many of them to be milder cases, patients who in other places would not seek hospital care at all. The total of these cases was 22,—17 children and 5 adults. There were 3 deaths, a mortality of 13.6 per cent., or of 17.6 per cent. for the children alone. Compared with the

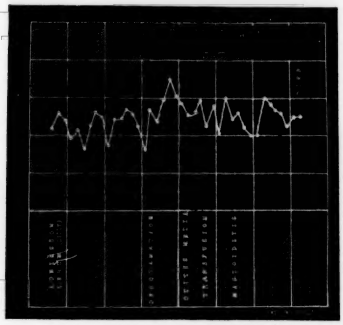

FIG. 1.

with serum was considered unnecessary. Among these there were 2 deaths, a mortality of only 11.8 per cent.

It is, then, necessary to turn to other features in order to glean from our data what information we can concerning the value of serum treatment. A review of our cases indicates that every death was due to so-called septic complications—the entire train of complications leading to the picture of septic scarlatina usually being present. We may then ask ourselves two questions: (1) Can the early administration of serum prevent the ordinary case from becoming septic? and (2) Can it prevent the development of individual septic complications which bear such a close relation to septic scarlatina? A definite answer to these questions should also answer the question of whether serum can be expected to lower the mortality rate. On the basis of statistical differences in percentages I am unable to give an answer, but I am able to cite individual cases in which it has failed to do so. As the total of our early-treated cases was only 17, these cases must be impressing. Fig. 3 illustrates the case of a boy treated on the first day of illness and because serum was administered before an exanthem had clear-

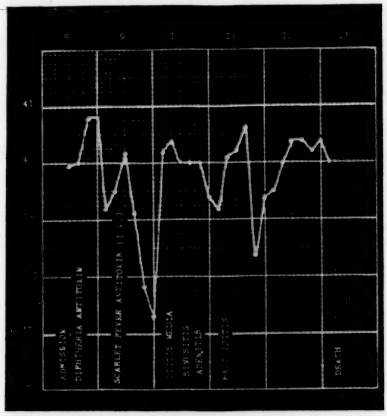

FIG. 2.

group who were treated late this percentage seems quite low. Of these there were 12 with 8 deaths, a mortality of 66.7 per cent. But the percentages cannot be compared as serum treatment was never withheld in septic cases regardless of the day of admission. They merely indicate that many patients are brought to the hospital because they have developed septic complications—an obvious fact. The absurdity of such a comparison becomes even more apparent when we review the remaining 17 cases of patients who came late and with whom treatment

ly developed I have left the diagnosis an open one between septic sore throat and scarlet fever. However, the case occurred at a time when scarlet fever was prevalent in the community and except for the rash, the development of which would have been prevented by serum, the case was in other respects typical of scarlet fever. As you can see, death occurred on the fifteenth day after the usual train of septic complications. In another patient with unmistakable scarlet fever, whom I saw outside of the hospital, serum was given early on the sec-

ond day, septic complications developed on the ninth day and death occurred on the fourteenth. Fig. 4 tells the story of a girl who was given serum on the second day of illness. Temperature drop and fading of eruption had occurred by the following day, but in spite of this, both eardrums required incision by the sixth day, the left mastoid was opened on the tenth and the right on the twelfth day. Fig. 5 illustrates the case of a child who was given serum on the second day and who developed a late adenitis on the twenty-second day. Finally, although not to be classed as a septic complication, Fig. 6 shows the record of a boy who was given serum on the second day and who developed a typical hemorrhagic nephritis on the sixteenth day.

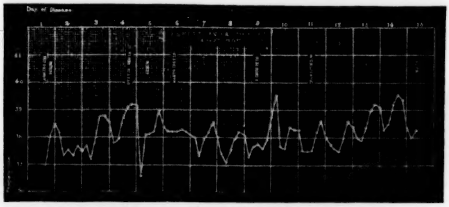

FIG. 3.

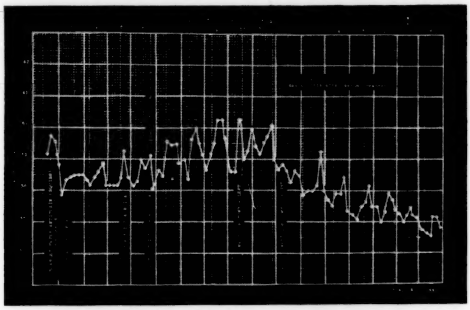

FIG. 4.

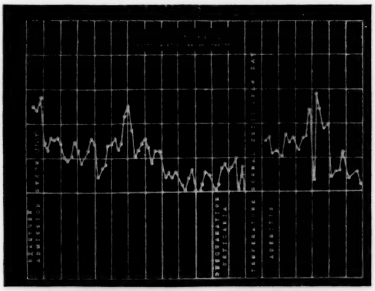

FIG. 5.

By what has been said I do not wish to convey the idea that no cases were encountered in which rapid subsidence of fever and fading of rash following serum therapy led to an impression of a directly favorable action. Two such cases were met with and I present them here. (Figs. 7 and 8.) But I do wish to drive home

the uncertainty of mind with which we regarded all cases, a state of mind which could not be relieved by the knowledge that serum had been administered.

With regard to the efficacy of serum in toxic scarlatina, I have no data upon which to base an opinion. I have seen only one case in which it was possible to administer serum early. This patient, an American girl of 6 years, ultimately recovered and as the mortality in untreated toxic scarlatina is close to 100 per cent., it may be argued that she was benefited. In my own mind, because of the subsequent stormy course, I am not sure. Her story is told in Fig. 9. You will see that the illness was ushered in with vomiting and that within 24 hours the patient was unconscious, convulsing constantly, and the temperature had mounted to 41.5 C. Serum was administered at this time and by the following morning (the morning of the third day), the temperature had dropped by crisis, but the patient was still unconscious and deep slow respirations indicated a state of acidosis. Intravenous glucose was given at once and a sample of blood taken for analysis. This disclosed a normal level of blood sugar and a $CO_2$—combining power of 28 volumes per cent. As the acidosis had not been relieved by glucose, we turned to sodium bicarbonate, which, however, we hesitated to give by intravenous injection. The previous injection of glucose had been followed by a return of fever to 40.6 C. and the patient's condition was exceedingly grave. A total of 18 grams of the salt was therefore given by gavage in a series of three treatments at hourly intervals. By the time of the third gavage the patient had regained consciousness sufficiently to object to the passage of the stomach tube. By the following morning she was conscious and able to answer questions. The rest of the story is told on the chart, which shows that the child remained extremely ill until the ninth day, by which time definite febrile defervescence had commenced. In addition to the serum adminis-

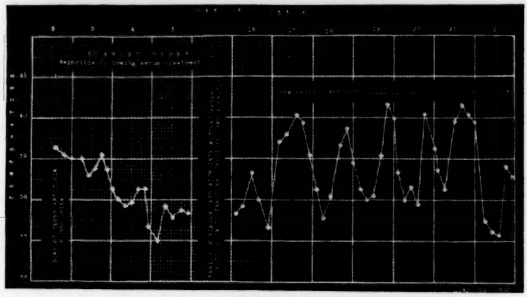

FIG. 6.

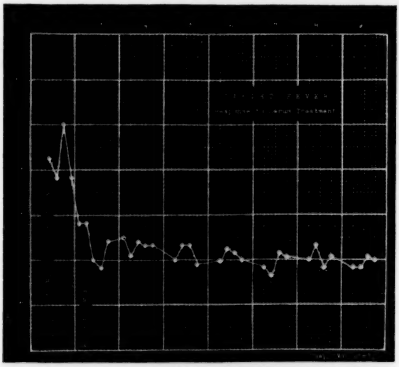

FIG. 7.

tered at onset the patient received convalescent human serum on the third day and more antiscarlatinal serum on the seventh.

One other line of thought has seemed to me to bear on the question of the value of serum in treatment. Soon after my arrival in China in October of 1928 our children's ward was visited by an epidemic which killed six children within the space of two weeks, the total number of those who contracted the infection. In all respects except one this disease bore the earmarks of scarlet fever. The exception lay in the absence of skin eruption. Although the children were scrutinized carefully every day, in not one instance did a rash make its appearance. The onset occurred with fever and a mild throat inflammation. As the disease progressed, the intensity of the throat symptoms increased, and the process spread to the nose, to the cervical lymph-nodes, to the middle ear and mastoids. Hemolytic streptococci were present in the throat in almost pure culture and sooner or later appeared in the blood stream. In one case the course was different in a way at once more dramatic and terrifying (Fig. 10).

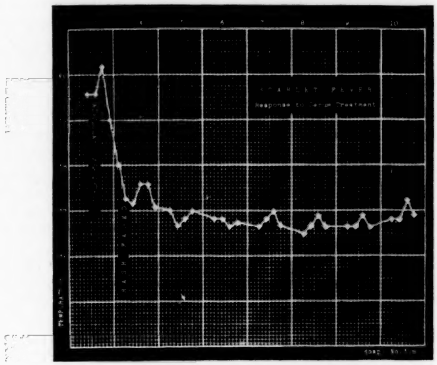

FIG. 8.

This child died within 14 hours of her first rise of temperature, at a time when the throat manifestations were exceedingly mild. Death was preceded by coma and convulsions and a rise of temperature to 40.6 C. Scarlet fever serum was given 6 hours before exodus without effect. In reviewing the group, one is impressed by the fact that if there had been an exanthem, the first five would have been classified as septic scarlatina and the sixth as toxic scarlatina. For want of the rash they were classified under the diagnosis "septic sore throat". I need not add that every physician sees many ex-

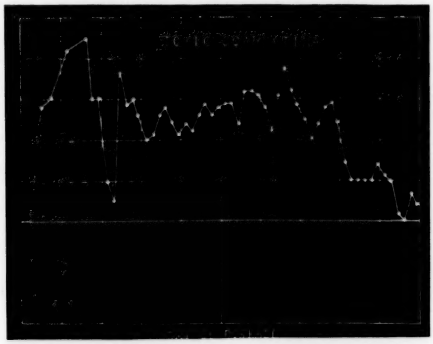

FIG. 9.

amples of streptococcus sore throat which, in the presence of an exanthem, would be classified as ordinary scarlet fever, neither septic nor toxic in type. I fail, therefore, to see any essential difference between streptococcus sore throat and scarlet fever except as rests in that property of the organism which has to do with the causation of a skin eruption. The parallelism between the two affections is exceedingly close as both may occur in ordinary, septic or toxic forms.

The bearing of this experience on the possible value of serum therapy is at once evident. One naturally asks the question: "Does serum merely convert scarlet fever into streptococcus

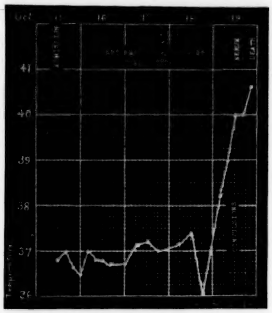

FIG. 10.

sore throat?" That given intradermally it will cause local blanching of the rash is generally admitted; that intramuscular administration may be followed by general fading of the eruption is widely conceded. The evidence that it does more than this seems to me unconvincing. As we have seen, the cases which I have discussed lend little encouragement to the view that serum can halt the invasion of tissues with streptococci when the invasive properties of the organism are highly developed. Death is due, or usually due, to the invasive characteristics; *patients do not die from a skin eruption.* In a country where the invasive property of streptococci is highly developed, streptococcus sore throat may be just as fatal as its first cousin, scarlet fever.

One other feature requires mention. We have used the sera of two well-known American manufacturers and at times a brand prepared by the National Epidemic Prevention Bureau in Peiping. Whether a special serum prepared from all the available local strains of streptococci would be more effective is an open question. We only know that the sera now used give as satisfactory a Schultz-Charlton reaction as is usually observed in this country. Perhaps the dose is wholly inadequate. We have administered serum in the amounts recommended by the manufacturers, sometimes in double and occasionally in triple amounts, but have not gone higher. We have not seen that the larger doses were more effective than the smaller ones. I feel strongly, however, that when the proper serum is made, it will be truly antibacterial as well as antitoxic and effective as a therapeutic weapon even when administered later than the third day of illness.

In conclusion I may say just a word regarding the value of prophylactic immunization with streptococcus toxin. Although I have seen several cases of scarlet fever in patients who had received immunizing injections within a space of less than two years, none of these patients had been treated by the detailed and rigid procedure now advocated by the Dicks[3]. My experience, therefore, only goes to show that a positive Dick test usually becomes negative after the injections. Nevertheless, I cannot help wondering whether patients so immunized will not, when exposed, develop a disease which, because of the absence of a rash, would be classified as streptococcus sore throat rather than scarlet fever. In a country where the natural virulence of streptococci is low, such cases easily pass unnoticed. In a country where the virulence is high, I have reason to believe the mortality would be just as high as from genuine scarlatina. Therefore, not until reliable data regarding the incidence of streptococcus sore throat after active immunization becomes available can I be more than skeptical regarding the life-saving merits of this procedure.

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# VERMONT STATE MEDICAL SOCIETY

## TREATMENT OF SIMPLE FRACTURES ON THE FRACTURE SERVICE AT THE MASSACHUSETTS GENERAL HOSPITAL*

BY HORACE K. SOWLES, M.D.†

IF there has been any change in our attitude toward fractures during the last few years, it seems to me that this change has been an increasing emphasis on economical and functional results. This does not mean that the anatomical result has suffered because of this change of attitude. In fact, sometimes it has meant that we have been even more meticulous in the accuracy of our reductions although in some locations we have learned to disregard the anatomical reduction to a certain extent in order to get an early return of function.

In this group of cases where we are anxious to get an absolutely perfect anatomical restoration of the fragments, there has been a definite increase in the number of open reductions. In many cases the reasoning which leads to the choice of an open reduction has been somewhat as follows: If the bone is perfectly reduced and held in reduction either by internal fixation or external fixation in the form of splints, we will get a more rapid union and, therefore, can begin active motion more quickly and accomplish an earlier return of function.

I think that the proportion of open reductions on the fracture service at the Massachusetts General is unusually high. The reasons for this high instance of open reduction are several: First, only the more serious cases are admitted to the hospital, the less severe and the ambulatory cases being treated in the Emergency Ward and then followed in the Outpatient Department; secondly, probably our type of admissions represents a rather difficult group because oftentimes only the difficult problems are sent in to us from the surrounding communities; thirdly, the problem that I have just mentioned of getting a perfect reduction for the sake of hastening the possibility of early active motion.

I have studied a hundred consecutive cases of admissions on the fracture service in order that I might give you just one or two figures as to the type of treatment which we have been using. Of one hundred cases of simple fractures, 78 were treated by closed reduction and 22 by open reduction. Among the 78 closed reductions, there were 16 cases treated with traction. Eight of these had traction applied to the skin and 8 had skeletal traction.

Skeletal traction is a most useful addition to our methods of treatment. We use three methods of applying skeletal traction. One is the Steinmann pin which is particularly useful when we wish to put traction through the os calcis for fracture of the lower leg or through the anterior crest of the tibia to secure traction in cases of fracture of the lower end of the femur. Then there are the ice tongs which are particularly adapted to the employment of skeletal traction when applied to the lower condyles of the femur. There is also the Kirschner wire which may be considered interchangeable with the Steinmann pin according to the personal selection of the operator.

In the limited time at our disposal today, I wish to refer very briefly to the more common types of fractures and specify the method of treatment that we have been in the habit of using.

To begin with the upper extremity, first of all comes the clavicle, a fairly common fracture which does not present any great difficulties as a rule. Our standard method of treatment is a figure of eight bandage across the back passing under each axilla and in front of the shoulders. This bandage may be plaster of paris or the familiar elastic "Ace" or "Bender" bandage. This gives a very satisfactory reduction in most cases. Sometimes it may be necessary to use the clavicular cross in order to hold the patient in a more perfect upright position. I think as a rule the clavicular cross does not accomplish enough more than the bandage to make up for its additional discomfort and clumsiness. Only very rarely have we had to do an open reduction on a clavicle in order to secure more complete fixation of the fragments. We have seen one or two bad end results where the deformity of the clavicle was so great that it caused pain by pressure on the brachial plexus.

Next comes the humerus. A fracture through the surgical neck of the humerus is the typical location where we have learned to neglect the anatomical position of the fragments, more or less, for the sake of early return of function. If a fracture through the surgical neck is not grossly displaced, particularly if it is impacted, we make no attempt at reduction. The arm is kept in a sling and swathe for forty-eight hours. Then the patient is allowed to sit on the edge of a chair, the injured arm is allowed to hang free in full extension, the patient is encouraged to relax the shoulder muscles completely and gently swing the arm forward and

*Read at the meeting of the Vermont State Medical Society on October 3, 1930, at Burlington, Vermont.

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backward. Much to the surprise of the patient, this can be accomplished without any pain if the relaxation is complete. This exercise is done frequently throughout the day and the patient is very soon able to increase the range of motion. As an aid in this swing motion, it is a great help for them to hold a small weight in the hand such as a bag of shot or as they progress in their convalescence even a weight as heavy as a flatiron. This weight has a tendency to increase the pendulum action of the arm swing and carries the arm back and forth without any muscular effort at the shoulder which is the thing to be avoided during the early stages. We find that a return of function under this treatment is very prompt. It is not at all unusual for a patient to be able to put his hand above his head to comb his hair, etc., at the end of three weeks, at which date, as a rule, the ecchymosis about the upper arm is still present.

The shaft of the humerus is a distinctly different problem and it is rather difficult to outline any specific treatment for the individual case. I think the more difficult ones are treated most successfully in bed with traction on the arm at right angles to the body. It is usually possible to get a good reduction by this method. It is sometimes possible to use an ambulatory traction splint to accomplish the same result. Also, the aeroplane splint or plaster of paris case of the upper trunk including the injured arm works very well in selected cases. A few of these cases will come to open reduction.

Fractures of the lower end of the humerus through the condyles and often involving the elbow joint are, as a rule, treated by fixation in acute flexion and then fairly early active motion. Here again there are several complicating elements in this type of fracture. It may be necessary to treat with traction or even open reduction in order to get a satisfactory replacement of the fragments. If it is accompanied by a dislocation of the elbow, it means a great deal of trauma and laceration of the structures around the elbow joint and usually considerable stripping up of the periosteum at the lower end of the humerus. Then our prognosis for a complete return of function is distinctly poor because these are the type of cases that must be kept in complete fixation for long periods of time. The extensiveness of the injury seems to stimulate a very marked deposit of calcium around the elbow joint, sometimes even an ossification of the surrounding joint capsule, which may cause a complete ankylosis of the joint as a result of a bony bridge in the capsular structures. This proliferative process is only aggravated by any attempt at motion and we must keep these cases in fixation until this bone-forming tendency entirely subsides. This period may be from four to six months. It is only fair to say that these elbows often acquire a sufficient amount of mobility even after these long periods of fixation so that we would classify them as useful arms.

Fractures of the olecranon are all treated by open reduction and suture of the fragments by means of fascia lata. This fascia lata preferably should be passed through drill holes in the two fragments but sometimes it is necessary on account of the small size of the upper fragment or a comminution of the fragments simply to lay a plaque of fascia lata over the tip of the elbow suturing to the triceps tendon above and tacking it down to the structures immediately overlying the ulna below.

Fractures of the head of the radius, unless grossly displaced or so comminuted that they seem likely to interfere with the rotation of the forearm, are treated by merely supporting in a sling and early active motion, this active motion beginning within forty-eight hours and being limited by pain. Occasionally the head is excised if it is grossly displaced. The reason for avoiding operative procedure on this type of fracture is that the trauma of the operation seems to stimulate a deposit of bone at the site of operation which may be a serious factor in the return of normal rotation.

Fractures of the shaft of the radius and ulna are rather difficult to reduce. On our service, this particular type of fracture comes to open reduction in more than fifty per cent. of the cases. It is very difficult to manipulate the two bones and get a good apposition of both by means of closed reduction although it can occasionally be accomplished with the aid of a fluoroscope. When we do an open reduction on this type of case, as a rule it is not necessary to put in a bone plate. The fragments can be usually locked together with sufficient stability so that one may close the wound and apply plaster without losing the reduction. If necessary, a bone plate or, beefbone wedge inserted in a saweut, is put in at the site of fracture.

Fractures of the lower end of the forearm, or Colles' fracture, almost never come to open reduction as usually a satisfactory closed reduction can be obtained. Impaction should always be completely broken up and if there is any contraindication to a general anesthetic, the operation can be done very satisfactorily under local anesthesia. Fifteen or twenty cubic centimeters of 2% novocain injected into the site of fracture gives perfect anesthesia in ten minutes. Sometimes it is necessary, in order to maintain the reduction, to put the patient up in the Cotton Loder position which is extreme flexion and extreme pronation of the wrist.

Fractures of the carpus are as a rule rather unsatisfactory. The disability is prolonged and complete return of function without pain is very often hard to obtain. The most common injury of the carpus is a fracture of the scaphoid or a dislocation of the semi-lunar. We believe the best result in a fracture of the scaphoid is ob-

tained by a prolonged fixation of the wrist in extreme extension with abduction of the thumb. We keep the wrist fixed in this so-called cock-up position for six weeks and then fit the patient with a reinforced leather brace which maintains this same position but allows active use of the fingers. With this leather brace, we encourage them to go back to work and have them continue with a leather brace for four to six months but often the patient will discard it sooner because it is a nuisance. Our opinion is that it is only by this extremely long period of fixation in the extended position that we can get a bony union of the fragments of the scaphoid and a wrist that is free from pain afterwards. Several of the cases of non-union of the scaphoid have been treated very successfully by bonegraft, a small sliver of bone being taken either from the lower end of the radius or from the tibia. We do not advise excision of the scaphoid or any of the fragments of the scaphoid in the acute cases although occasionally it may be necessary in the chronic cases. In the fresh cases of dislocation of the semilunar, it is usually possible to reduce it. In the old cases, it is usually necessary to excise the semilunar through a posterior incision.

Next we come to fractures of the femur. Fractures of the neck of the femur are the most unsatisfactory group of cases that we have. Our results are poor and I do not know just what to say about treatment. A few years ago we were treating almost all of them by plaster spica in Whitman position. Our results were disappointing. This injury usually occurs in old people and thirty per cent. of these cases die while under treatment. Less than sixty per cent. succeed in getting bony union of the fragments. Other types of treatment, which include the ordinary spica, or traction, or rest in bed with sandbags, give about the same figures as regards mortality but even poorer figures with regard to bony union. I might add here that a summary of these statistics of fractures of the neck of the femur will be reported in detail by Dr. Reggio in the October number of the *Journal of Bone and Joint Surgery*. We are groping for a better method of treatment in this type of case. Dr. Smith-Petersen has developed an operation for open reduction and nailing the head back on to the femur, or to be more accurate, in the usual case, the trochanter and base of the neck is nailed to the head. He now has a series of thirty or more cases treated in this way which show a definite improvement as regards bony union and return of function over our other methods of treatment. I believe he has approximately eighty per cent. of cases with solid bony union. He will undoubtedly report this operation and its end results in due time.

Fractures through the trochanter present no particular problem. They always get bony union and it is usually easy to get a perfectly satisfactory reduction with moderate amount of skin traction and a moderate amount of abduction.

Fractures of the shaft of the femur are made difficult largely because of the power of the thigh muscles which prevent easy reduction and tend to cause overriding of the fragments. Here is the location where we resort in a great majority of cases to skeletal traction applied by means of icetongs to the lower condyle of the femur. In this way we can usually get a perfectly satisfactory reduction and often an absolutely perfect reposition of the fragments. A few cases for one reason or another do come to open reduction and application of a bone plate. In children, we use skin traction instead of skeletal traction.

Fractures of the lower end of the femur are made difficult by the fact that the lower fragment is displaced by muscle pulls so that it has a tendency to rotate backward into the popliteal space. This type of case usually is treated satisfactorily by skeletal traction applied by means of a Steinmann pin passed through the anterior crest of the tibia and traction made with the knee in a flexed position. This is not always successful and if it fails, an open reduction is indicated. We have had one or two distressing results in young persons who have had a fracture involving part of the epiphyseal line of the lower end of the femur which has caused a disturbance in the growth on one side of the epiphysis and very extreme knock-kneed deformity.

All fractures of the patella are treated by open reduction. Here again, as with the olecranon, we use a fascia lata suture passed through drill holes in the fragments as well as a careful suture of the lateral expansion of the joint capsule with chromic catgut.

There is one fracture in the region of the knee joint which has been in the past rather uncommon but which is now becoming very frequent and which we have christened "the bumper fracture" because it is usually sustained as the result of a blow at the outer side of a knee joint with the bumper of an automobile. The pathology in this particular fracture is as follows: The internal lateral ligaments of the knee joint are fairly solid structures and instead of giving away at this point, the external condyle of the femur is jammed down into the outer table of the tibia so that sometimes the whole outer table of the tibia may be depressed a half inch or more below the level of the internal table. There is usually an accompanying fracture of the upper end of the fibula. This is a very distressing fracture. It takes a long while to become solid enough to bear weight and it leaves the patient with an unstable knee joint. The ideal thing to do in this type of injury is to elevate the outer table of the tibia back to

its normal position. This, however, is a very difficult thing to do because the bony structure of the upper end of the tibia is soft cancellous bone with a very thin cortex. This bone is often just crushed into a soft, mushy condition; therefore, attempts to elevate the articular surface are often unsuccessful or if it is elevated, we have not sufficient solid bony structure so that it may be held in position. Perhaps the best thing that can be done is to elevate the articular surface carefully and then pack in bony chips from the adjoining tibia in order to hold the table up in position. Then apply traction to the lower leg to distract the articular surfaces in the knee joint. These patients should not bear weight for at least six months and then should have a Thomas walking caliper brace so that they will not develop a knock-kneed deformity. If an open reduction is not done, then they should have the same prolonged period without weight-bearing and a walking caliper splint at the end of six months to be continued for another three months.

Fractures of both bones of the lower leg are treated largely by skeletal traction. This skeletal traction is applied by means of a Steinmann pin passed through the os calcis. This method is used as a routine on the fracture service unless the ends of the fragments are so nearly transverse that they will not have a tendency to override each other. If the position is good and the fragments are locked in such a way that they cannot slip, we feel safe in applying a plaster cast; otherwise, even though the position is good at the time of entry, our experience has been that these fragments will tend to override even when held within a cast.

Fractures of the lower end of the tibia above the ankle joint, the type commonly known as the Pott's fracture, are treated by reduction and fixation in plaster. In the reduction of these fractures, it is necessary to put the foot into normal position as regards its relation to the tibia and to prevent a widening of the articular mortise formed by the lower end of the tibia and fibula. Occasionally it is necessary to use skeletal traction or sometimes open reduction when there is a fracture line running longitudinally into the joint surface of the tibia causing a definite irregularity of that articular surface. Unless this irregularity is corrected, the patient will have a painful ankle joint.

Fractures of the os calcis are fairly common and sometimes present a little difficulty in treatment. This fracture is usually sustained by falling or jumping from some height and landing upon the feet. The pathology of this fracture is as follows: The os calcis sustains a crushing injury which forces the posterior end upward and flattens the central portion of the bone, tipping it outward. There is usually a fracture line which extends into the joint surfaces between the os calcis and the astragalus. In cases which do not involve this subastragaloid joint, it is usually sufficient to mold the body of the bone back into normal position and pull the posterior portion of the bone downward into its normal relationship, but we have found that when the subastragaloid joint is involved, the patient is sure to get a painful foot when he begins to bear weight. Therefore, in this type of case we have done a subastragaloid arthrodesis, the technique of which has been developed by Dr. Wilson. The patient is then put up in a plaster boot with the foot in the inverted position. After from six to eight weeks, the patient is allowed to begin weight-bearing with the boot on and after about four to six weeks more, he is allowed to bear weight with a temporary arch support. These cases obtain a firm bony union between the astragalus and the os calcis and although in most cases they have a moderate deformity of the foot they are free from pain. This operation can be done with equal success on the late cases which have had a trial by the ordinary closed reduction method but still have a painful foot.

I realize perfectly well that I have discussed this list very superficially but I have tried to indicate here and there the special problems which one is sure to encounter in the case of fractures, and which must be overcome by the individual operator, as he faces the individual case, with whatever equipment may be available.

Finally, if there is any way of expressing the policy of the Fracture Service in a few words, it might be expressed by the slogan "early active motion, but late weight-bearing".

## MISCELLANY

### VERMONT DEPARTMENT OF PUBLIC HEALTH

FEBRUARY, 1931

Vital statistics are now practically completed for the year 1930, and deaths from communicable diseases and cancer, as compared with the previous years, are shown by the following table:

| | 1928 | 1929 | 1930 |
|---|---|---|---|
| Cancer | 497 | 465 | 431 |
| Chicken pox | | | 1 |
| Diphtheria | 11 | 10 | 7 |
| Measles | | 5 | 3 |
| Scarlet fever | 6 | 6 | 11 |
| Smallpox | | | 2 |
| Typhoid fever | 9 | 8 | 3 |
| Tuberculosis of lungs | 227 | 215 | 207 |
| Tuberculosis all forms | 236 | 262 | 253 |
| Whooping cough | 11 | 17 | 16 |

Cases of communicable diseases were reported as follows: chicken pox 90, diphtheria 1, measles 62, mumps 136, scarlet fever 21, smallpox 1, streptococcic sore throat 7, undulant fever 2, whooping cough 75 and tuberculosis 12.

1235 examinations were made by the Laboratory of Hygiene, classified in the following manner:

| Examination | |
|---|---|
| For diphtheria bacilli | 97 |
| For Widal reaction of typhoid fever | 16 |
| For malarial parasite | 0 |
| For tubercle bacilli | 226 |
| For evidence of syphilis | 318 |
| For gonococci in pus | 114 |
| Of water, chemical & bacteriological | 10 |
| Of water, bacteriological | 126 |
| Of blood for contagious abortion in cattle | 111 |
| Of milk, market | 120 |
| Of milk, submitted for chemical only | 4 |
| Of milk, submitted for microscopical only | 25 |
| Of milk, submitted by Department of Agriculture for detection of added water | 2 |
| Of foods | 21 |
| Of drugs | 2 |
| For the courts, autopsies | 2 |
| For the courts, miscellaneous | 8 |
| Of animal heads for evidence of rabies | 1 |
| Miscellaneous | 31 |
| Autopsies to complete death returns | 1 |

There were 35 cases of gonorrhea and 38 cases of syphilis reported. 274 Wassermann outfits and 156 slides were distributed.

The nurses of the Poliomyelitis After-care Division visited 40 patients and made 40 home visits. Four patients were admitted to the Children's Hospital, one to the Massachusetts General and one to the Fenway Hospital (all of Boston). Sales by the vocational worker amounted to $73.10.

The State Advisory Nurse of the Maternity and Infancy Division visited five towns in the interests of this Division and also attended the follow-up meeting of the White House Conference in Washington. 246 letters have been sent out to the Parent-Teachers Associations in Vermont, urging them to join the "National Summer Round-up of Children."

### March, 1931

The incidence of communicable disease was unusually low, the largest epidemics being mumps and whooping cough, 145 cases of the former and 96 of the latter having been reported. Other diseases were as follows: chicken pox 68, diphtheria 4, measles 25, scarlet fever 43, undulant fever 1 and tuberculosis 19.

The Laboratory of Hygiene made a total of 1,369 examinations, classified as follows:

| Examinations | |
|---|---|
| For diphtheria bacilli | 90 |
| For Widal reaction of typhoid fever | 13 |
| For tubercle bacilli | 257 |
| For evidence of syphilis | 420 |
| For gonococci in pus | 139 |
| Of blood for contagious abortion in cattle | 54 |
| Of water, chemical & bacteriological | 14 |
| Of water, bacteriological | 136 |
| Of milk, market | 117 |
| Of milk, submitted for chemical only | 1 |
| Of milk, submitted for microscopical | 17 |
| Of foods | 10 |
| For the courts, autopsies | 1 |
| For the courts, miscellaneous | 22 |
| For animal heads for evidence of rabies | 1 |
| Miscellaneous | 73 |
| Autopsies to complete death returns | 4 |

In the Division of Communicable diseases, ten cases of gonorrhea and 21 cases of syphilis were reported. There were 573 Wassermann outfits and 160 gonorrheal slides distributed.

Fifty-eight patients were seen by the nurses in the Poliomyelitis After-care Division. Sixty-two home visits were made, 6 plaster casts removed and 1 plaster cast applied. Seven new pieces of apparatus were fitted, 10 pieces of apparatus altered or repaired, 25 orthopedic corrections made to shoes. One patient was admitted to the Fenway Hospital, 6 to the Children's Hospital and one to the Massachusetts General Hospital (all of Boston). Four patients were discharged from the Children's Hospital and 1 from the Massachusetts General Hospital. Sales made by patients through the vocational worker amounted to $63.67.

The State Advisory Nurse visited seven towns during March in the interests of the Maternity and Infancy Division, the greater part of the month being spent presenting to high-school girls the course on "Growth and Development of the Child from Two to Six." Letters have been sent out by this Division urging physical examination of all children entering the first grades next September.

## NORTHEASTERN COUNTY MEDICAL SOCIETY

The April meeting of the Northeastern County Medical Society was held at the Newport House, Newport, Vt., April 13. Twenty-two members were present.

Dr. H. E. MacDermot of Montreal gave a paper on Asthma. Dr. F. H. Rabinovitch of Montreal spoke on Diabetes.

Dr. J. M. Allen of St. Johnsbury, Vt., has returned from Florida, where he spent the winter.

Dr. Charles A. Cramton has returned from a two weeks' vacation in Havana.

Dr. Morton J. Robbins is practising medicine in St. Johnsbury, Vt.

Dr. W. B. Fitch is spending one week at Atlantic City.

Dr. F. E. Farmer is spending the week in Boston, Mass.

## WINDHAM COUNTY NOTES

A regular meeting of the Windham County Medical Society was held at Brattleboro on Friday, April 24, 1931, Dr. George B. Hyde of Wilmington, President, presiding. The meeting was called to order at 2:50 P. M. The regular business being soon disposed of, Dr. Hyde introduced the speaker of the day, Dr. Truman J. Allen, Superintendent of the Brandon State School. Dr. Allen presented in an interesting and instructive manner the subject of

"Mental Deficiency, Its Nature, Causes, Classification and Diagnosis." At the conclusion of this talk Dr. Allen kindly consented to read over and discuss the recently passed Sterilization Bill. The meeting was adjourned at 4:30 P. M. Immediately preceding the meeting a luncheon was served at the Hotel Brooks. There were present 18 members and four guests.

## CHITTENDEN COUNTY SOCIETY NEWS

Dr. Yvonne Turk has been admitted to membership in the State Society.

*March Meeting*—Dr. T. J. Allen of Brandon spoke on "Mental Deficiency."

*April Meeting*—Dr. Maxwell Lauterman of Montreal, P. Q., spoke on "The Problem of Cancer."

Dr. P. K. French of Burlington was admitted to fellowship in the American College of Physicians at its annual meeting in Philadelphia.

Dr. Lyman Allen addressed the February meeting of the Addison County Society. His subject was "Cerebral Injuries."

Dr. C. H. Beecher addressed the annual meeting of the Addison County Medical Society. His subject was "The Diseases of Allergy."

## EXCERPTS FROM BULLETIN OF THE COMMITTEE ON THE GRADING OF TRAINING SCHOOLS FOR NURSES

### Contagious Cases and Nursing Care

At least six out of ten nurses, of a group of more than 15,000 who were graduated in 1928, received no practical experience at all in a communicable disease service during their entire training.

About two out of three schools, or 713 of those studied, do not have such a service, nor do they affiliate with others to give their students this type of training.

These facts were gathered in a recent study made by the Committee on the Grading of Nursing Schools, to determine the kinds and amounts of practical experience student nurses are getting in training to fit them for the work they will be called upon to do as practising graduates.

They have an added significance because physicians complain of a lack of nurses for their contagious patients, and nurse registries state that many nurses are unwilling to take such cases. It would seem that this condition exists, in large measure, because the majority of nurses have had no adequate training in caring for communicable diseases.

Because of the nature of such diseases, the community's interest, as well as the individual patient's and doctor's, is involved. The importance of good nursing care for the control of communicable diseases was stressed by the Committee on Communicable Disease Control in its report at the recent White House Conference. The Committee estimates there are at least 3,000,000 cases of these diseases yearly, causing 15 per cent. of all deaths.

"Public health nurses can be and are one of the most important agencies in the administrative machinery of communicable disease control," says the report. "They can reach both parents and children in an exceptionally intimate way. . . . The nurses are often the first persons with some knowledge of disease to see a real or suspected case, and from their knowledge of control methods . . . are able in a special way to give effect to community measures of control."

Doctors and patients employing the private duty nurse also emphasize her importance in the control and care of these diseases.

"Without her, the nurse," wrote a Massachusetts doctor to the Grading Committee, "I fear the neighbor's four children would have been exposed to the contagion." (A scarlet fever case.) "She was the greatest factor in saving our baby," wrote the mother of a child with whooping cough-lobar pneumonia.

The doctor with the contagious patient wants a nurse who knows how to give the general care needed, who can follow orders, and who can observe and report symptoms accurately, say the doctors who have to deal with such cases. He wants a nurse who will give such high-grade care that his patient may be saved from unnecessary complications.

Since early detection of symptoms in several types of communicable disease is important, and since a technique of contagion is necessary for the control of these diseases, the nurse should have experience with and observation of such cases during training.

In diphtheria and pneumonia, for example, those symptoms, which show a weakening of the heart under strain, call on all the nurse's art to keep the patient quiet. Indeed, the competent nurse, by safeguarding her patient from muscular effort, often saves him from such symptoms.

About one-fifth, or 22 per cent., of a group of registrars of various types of nurse supply agencies, listed contagious cases as among those hardest to fill. This is a higher rate even than for obstetrical cases.

Twenty-seven out of every 100 of the private duty nurses reporting to the Grading Committee said they would not take contagious cases if they could avoid them. These cases are first on the list of those registered against, including obstetric and mental cases, 24-hour and night duty. Of 486 Massachusetts nurses, for example, 146 said they register against contagious cases. About one in four New York nurses, or 344 out of 1,334 do so; and one-fifth of 45 Kansas nurses.

As was previously stated, when the records of 15,694 graduates of the class of 1928 were examined, it was seen that 9,488, or 60 per cent., did not get practical experience during training in a communicable disease service, because their schools neither furnish it nor affiliate for it.

The special nursing techniques through which contamination and cross-infections are prevented, however, are not taught, as a rule, except in the separate communicable service. Also, the recognition of

(Continued on page 993)

# NEW HAMPSHIRE MEDICAL SOCIETY

## THE ONE HUNDRED AND FORTIETH ANNUAL MEETING

**Hotel Carpenter, Manchester, N. H.**
**Tuesday and Wednesday, May 19-20, 1931**

THE first meeting of the House of Delegates will be held Monday evening, May 18, at 7:30 o'clock, Hotel Carpenter, and subsequent meetings will be in the same place.

The Scientific Sessions will open promptly at 10 o'clock A. M., Tuesday, with General Meetings forenoon and afternoon, Tuesday and Wednesday.

Wednesday evening, May 20, Banquet 6:30 o'clock, Hotel Carpenter. Tickets—$2.50 each.

All meetings will be called to order promptly at the stated hour—Standard Time.

### OFFICERS

*President*

Osmon H. Hubbard, Keene.

*Vice-President*

George C. Wilkins, Manchester.

*Secretary-Treasurer*

D. E. Sullivan, Concord.

*Councilors*

| | Term Expires |
|---|---|
| Harry O. Chesley, Strafford County | 1931 |
| Abram W. Mitchell, Rockingham County | 1931 |
| Richard W. Wilder, Coos County | 1932 |
| F. E. Clow, Carroll County | 1932 |
| Clifton S. Abbott, Belknap County | 1933 |
| Arthur T. Downing, Grafton County | 1933 |
| A. A. Pratte, Cheshire County | 1934 |
| Emery M. Fitch, Sullivan County | 1934 |
| Henry H. Amsden, Merrimack County | 1935 |
| Clarence O. Coburn, Hillsborough Co. | 1935 |

*Trustees*

| | |
|---|---|
| Thomas W. Luce, Portsmouth | 1931 |
| Alpha H. Harriman, Laconia | 1931 |
| Ira J. Prouty, Keene | 1933 |

### HOUSE OF DELEGATES

The President, ex-officio.
The Vice-President, ex-officio.
The Secretary-Treasurer, ex-officio.

*Rockingham County*

Not reported.

*Merrimack County*

David R. Brown, Concord.
Thomas M. Dudley, Concord.
George M. Crowell, Suncook.

*Cheshire County*

Ira J. Prouty, Keene.
Frank Dinsmoor, Keene.

*Grafton County*

R. G. Perry, Wells River, Vt.
F. P. Lord, Hanover.

*Sullivan County*

*Howard A. Hanaford, Newport.
Henry C. Sanders, Jr., Claremont.

*Hillsborough County*

D. G. Smith, Nashua.
P. Bergeron, Manchester.
Benjamin G. Moran, Nashua.
W. P. Grimes, Hillsborough.
D. W. Parker, Manchester.

*Belknap County*

C. L. Smart, Laconia.
N. W. MacMurphy, Belmont.

*Carroll County*

Charles C. Smith, Conway.
Edwin C. Remick, Tamworth.

*Strafford County*

H. O. Chesley, Dover.
D. L. Stokes, Rochester.

*Coos County*

J. A. Ferguson, Lancaster.
A. C. Johnston, Gorham.

*Deceased.

### HOUSE OF DELEGATES

MONDAY, MAY 18, 7:30 P. M.

Hotel Carpenter

Speaker, Samuel T. Ladd, Portsmouth.
Vice-Speaker, Frederic P. Lord, Hanover.

*Order of Business*

Subject to Approval of the House

Roll Call.
Minutes of last meeting.
Appointment of Committees.
Reports of Officers.
Reports of Standing and Special Committees.
New Business.
Report of Committee on Nominations. (First business of second day.)
Election of Officers.

New Business.
Unfinished Business.

ANNOUNCEMENTS

Note carefully the program.

Every member is requested to register and receive a badge before entering the General Assembly Hall. Ample provisions will be made for these purposes. Please present your membership certificate when registering.

As heretofore, the usual exhibition of x-ray apparatus, books, surgical appliances, drugs and foods will be held. Application for space should be made to Dr. D. W. Parker, Manchester.

Ladies of visiting members are cordially invited to visit Manchester during the state meeting and are urged to attend the banquet Wednesday evening.

Members of the resident Ladies Committee will be in attendance at headquarters to render such services as may be desired by the visiting ladies.

During the discussion of papers, the speakers will please announce their names plainly for the benefit of the stenographer, and then walk forward to the platform so that the audience and the stenographer may plainly hear what is said.

All meetings will be called to order promptly at the hour stated.

Discussion of papers is open to all members and guests of the Society. It is not limited to those named on the program.

## GENERAL MEETING

TUESDAY, MAY 19, 10 A. M.

Standard Time

Call to order by the President, Osmon H. Hubbard.

Invocation, Rev. W. W. Anderson.

Report of Committee on Arrangements, Henry W. N. Bennett.

Introduction of Visiting Delegates.

Introduction of members in practice fifty years, 1881-1931.

*Treatment of Peritonitis Resulting from Viscus Perforation.* George C. Wilkins, Manchester.

Discussion: James W. Jameson, Concord; Chester L. Smart, Laconia.

REPORT OF CASES

(10 minutes each)

*Non-traumatic Gas Bacillus Infection in Neck of Child Following Middle Ear Infection.* John A. Hunter, Dover.

*Anorexia Nervosa.* Fred E. Clow, Wolfeboro. Lantern slides.

*Auricular Fibrillation Following a Massive Dose of Chloral.* Deering G. Smith, Nashua.

*Acute Lymphosarcoma.* Frederick P. Scribner, Manchester.

General discussion on Case Reports.

TUESDAY, MAY 19, 2 P. M.

*The President's Address.* Osmon H. Hubbard, Keene.

*Coronary Occlusion and Angina Pectoris.* George Blumer, New Haven, Conn.

Discussion opened by: Arthur B. Howard, Concord; Thomas M. Dudley, Concord.

*The Significance and Treatment of Cardiac Symptoms and Signs.* Paul D. White, Boston.

Discussion opened by: Granville E. Hoffses, Manchester; Wendell P. Clare, Portsmouth.

*Hypertension.* Walter F. Taylor, Keene.

Discussion opened by: Walter H. Lacey, Keene.

TUESDAY EVENING—7:30 O'CLOCK

*Cardiac Conditions.* (Original lantern slides.) Dr. Hugo Roesler, Vienna, Austria.

*Salpingectomy and High Fundic Amputation.* (Motion picture with sound, 35 minutes.)

WEDNESDAY EVENING—6:30 O'CLOCK

BANQUET

Dr. William H. Leith, Anniversary Chairman.

*Speakers:*

Dr. Osmon H. Hubbard, President New Hampshire Medical Society.

His Excellency, Governor John G. Winant.

Dr. William Gerry Morgan, President American Medical Association.

Prof. L. B. Richardson, Dartmouth College.

Hon. Raymond B. Stevens, Landaff, Adviser to the King of Siam.

Rev. Donald Fraser.

Let every member realize he will learn something through attendance at these meetings and arrange his business so as to be present.

Visit the exhibits.

WEDNESDAY, MAY 20, 10 A. M.

Introduction of Visiting Delegates

*Iopax in the Diagnosis of the Diseases of the Genito-urinary Tract.* Eugene A. Vickery, Portsmouth; Harry O. Chesley, Dover. (Lantern slides.)

*Some Types of Anemia and Their Treatment.* William Dameshek, Boston.

Discussion opened by: Richard W. Robinson, Laconia; John F. Holmes, Manchester.

*Diets in Pregnancy in Relation to Low Blood Calcium Values at Lactation.* H. T. French, M.D., C. E. Bolser, Ph.D. (The Hitchcock Clinic, Hanover.)

Discussion opened by: Robert H. Brooks, Claremont; Frank N. Rogers, Manchester.

*The General Practitioner on the Witness Stand.* Charles F. Keeley, Claremont.

Discussion opened by: Benjamin G. Moran, Nashua; Roland J. Joyce, Nashua.

WEDNESDAY, MAY 20, 2 P. M.

Presentation of 50-year Membership Gold Medal to Edward O. Otis, Exeter.

*Early Diagnosis of Cancer of the Larynx.* Thomas J. Morrison, Somersworth.

Discussion opened by: Raymond H. Marcotte, Nashua; George C. Wilkins, Manchester.

*Address:* William Gerry Morgan, Washington, D. C., President American Medical Association.

*The Administrative and Economic Aspects of the Rural Hospital as an Agency of Social Service.* James A. Hamilton, Hanover, President New England Hospital Association.

Discussion opened by: William P. Clough, New London; Ralph W. Tuttle, Alton.

Report of House of Delegates.

Report of Trustees.

Installation of Officers.

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## WOMAN'S AUXILIARY TO THE NEW HAMPSHIRE MEDICAL SOCIETY

### 1931

*Program*

TUESDAY, MAY 19

Headquarters—The Carpenter

Register, Please!

10:30 A. M.

Executive Board Meeting—The Carpenter.

12:30 P. M.

Get-Together Luncheon — Country Club. Guest of Honor, Mrs. F. L. V. Spaulding.

Greetings—Dr. O. H. Hubbard, President of New Hampshire Medical Society; Dr. G. C. Wilkins, Vice-President New Hampshire Medical Society.

Music with State Song, composed by Dr. John F. Holmes.

*Toasts:*

"The Doctors — Our Men", "Appreciated Blessings", "Solvable Puzzles", "Supreme Masters", "Guardians of Angels".

The Doctors' Wives in Various Poses.

Responses by Twelve of Us.

As Others See Us—Mrs. F. L. V. Spaulding.

Bridge—Golf.

WEDNESDAY, MAY 20

10:30 A. M.

State Executive Board Meeting—The Carpenter.

12:30 P. M.

Luncheon—Y. M. C. A. Building.

Music with State Song.

Reports of County Presidents.

2:30 P. M.

"Reserve Energies" — Elwood Worcester Ph.D., D.D., The Craigie Foundation.

Business—Election of Officers.

Induction of Incoming President.

6:30 P. M.

Banquet of the New Hampshire Medical Society—The Carpenter.

Ladies are requested to secure tickets for the two luncheons at the time of registration. No charge for one luncheon but tickets for both issued for convenience.

Transportation arranged for when desired.

OFFICERS 1930-31

*President*

Mrs. O. H. Hubbard, Keene.

*First Vice-President*

Mrs. G. E. Hoffses, Manchester.

*Second Vice-President*

Mrs. D. G. Smith, Nashua.

*Recording Secretary*

Mrs. H. N. Kingsford, Hanover.

*Secretary-Treasurer*

Mrs. R. W. Tuttle, Alton.

*Auditor*

Mrs. G. S. Emerson, Fitzwilliam.

COUNTY COUNCILORS

*Belknap*

Mrs. Joseph Wiley, Weirs.

*Carroll*

Mrs. B. F. Horne, Conway.

*Coos*

Mrs. F. L. Gilbert, North Stratford.

*Cheshire*

Mrs. E. A. Tracy, Keene.

*Grafton*

Mrs. E. M. Miller, Woodsville.

*Hillsboro*

Mrs. Harry Morse, Peterboro.

*Merrimack*

Mrs. Dennis E. Sullivan, Concord.

*Rockingham*

Mrs. J. C. Tappan, Derry.

*Sullivan*

Mrs. Robert H. Brooks, Claremont.

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## SYMPOSIUM—INTRACRANIAL PATHOLOGY, LESIONS, DIAGNOSIS AND TREATMENT*

BY TIMOTHY LEARY, M.D.†

THIRTY-FOUR brains were demonstrated, with discussion of the symptomatology, pathology, diagnosis and treatment of those cases which were most instructive.

The collection of brains was rich in the traumatic field and covered intracranial pathology apart from the tumors, which Dr. Cushing's clinic accounts for, and the lesions associated with the psychoses, which the state hospitals care for.

The growing importance of the traumatic injuries of the brain was stressed and an appeal

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was made for deeper study of the group of lesions which is increasing rapidly under the universal motorization which is characteristic of this civilization.

The term *fractured skull*, which is used to embrace head injuries from the minor to the major degree, does not measure, except in the extremes, the damage to the human being. Fractures of the skull are less significant as fractures than those of other bones. Massive fractures which include the carotid canals or the jugular fossa may lead to rapid exsanguination as the result of rupture of the vessels contained in these openings. Depressed fractures may continue focal pressure on the brain and thus prolong the initial damage to the brain. Fractures opening connections with mucous surfaces, such as those across the ethmoid, the other sinuses and the middle ears may serve to admit infection to the membranes and the brain. To this group belong the fractures in relation to scalp wounds which become septic. Basically, fractures of the skull are important because of the damage to the cranial contents. Intracranial pressure may be raised to the point of producing death. Even minor hemorrhages in regions like the medulla may cause rapid death. Damage to the brain by contusion and laceration may give rise to immediate or delayed harmful effects. Late bad results consist of mental disturbances, epilepsy, etc. The delay in organizing and replacing trapped subdural hemorrhages may have an important influence on the physical and mental future of the individual.

In presenting the following brains Dr. Myerson dealt with the clinical, diagnostic and therapeutic questions from the medical standpoint, particularly with reference to lumbar puncture and spinal fluid, and Dr. Hodgson from the surgical standpoint with particular application to skull fractures. The brains were demonstrated by Dr. Leary.

I. Paradoxical Findings.

1. Brain from extensive U fracture of skull with rupture of right carotid artery and internal jugular vein and exsanguination through middle ear. Though there was depression of the fracture in the right parietal region the brain was intact and showed only minor small subarachnoid hemorrhages in the base.

2. Brain from a man who fell on a stairway, sustaining minor scalp wound and no fracture of the skull. Extensive subarachnoid hemorrhage.

II. Intracranial Hemorrhages.

*a. Extradural.*

3. Brain showing left extradural hemorrhage due to fall during epileptic seizure. Epileptic attacks at intervals following accidental fall downstairs twelve years previously. Temporal decompression on eighth day. In addition to compression from extradural hemorrhage, cystic change, extensive, of right temporal lobe at site of old contusion and laceration. Window of dura attached.

4. Extradural hemorrhage in a man who had fallen in the street one month before his death and sustained head injury with bleeding from ear. Second fall on stairs on the night before his death. Extradural hemorrhage due to latter fall and contusion and abrasion due to old fall. Repairing fracture of skull due to old fall and fresh fracture along middle meningeal groove due to the recent fall.

*b. Subdural hemorrhage.*

5. Recent—alcoholic recovering from spree—doing well—found dead one-half hour later. Subdural hemorrhage with fluid blood. Bleeding vein in surface of pia-arachnoid over base.

6. Brain of man who went on spree and died suddenly. Unilateral subdural hemorrhage causing moulding of one hemisphere and flattening of the other.

7. Sudden collapse on street. Subdural hemorrhage due to rupture of slender pedicle attaching top shaped meningioma to dura. Meningioma buried in surface of brain by pushing pia-arachnoid ahead of it.

*c. Traumatic subdural hemorrhages.*

8. Brain of woman struck by automobile. Depressed fracture, vertical, of left parietal region with laceration of the brain due to direct violence. Much more extensive contusion and laceration of right convexity and base due to contrecoup.

9. Brain of woman found sitting in a doorway dead. Probably struck by automobile. Depressed fracture of right parietal region. Extensive contusion and laceration of left temporal and both frontal lobes over both base and convexity.

10. Brain of a woman struck by an automobile, semicomatose, bleeding from the right ear. Drainage from the ear continued for two days. Her condition became rapidly worse and she died. Natural decompression and abrupt termination when drainage ceased, moderate contrecoup contusion of left temporal region.

11. Brain of man who was shot in the left forehead with production of extensive fracture of skull. In addition to bullet injury, direct contusion of occipital surface of brain and contrecoup injury of frontal lobes due to the fall which followed.

*d. Subarachnoid hemorrhage.*

12. Rupture of aneurysm of basilar artery.

13. Sudden death following coitus. Subarachnoid hemorrhage, particularly basilar. Maldevelopment of arteries at base, marked by faults and thinning of media.

14. Man picked up on street unconscious. Spinal tap showed bloody fluid under high pressure. Thought to be a case of subarachnoid hem-

orrhage. Repeated spinal drainage reduced red cells in spinal fluid from 780,000 to 78,000 but did not relieve pressure. Brain showing extensive contusion and laceration.—Fracture of skull.

*e. Essential hemorrhage.*

15. Typical. Extensive hemorrhage extraventricular in standard site.

16. Typical. Hemorrhage finally rupturing into ventricles.

17. Typical. Hemorrhage rupturing into ventricles and also into subarachnoid space.

18. Atypical. Right frontal hemorrhage in woman of forty years. Hypertension.

19. Atypical. Pontine hemorrhage.

20. Atypical. Ponto-medullary—very small, immediately fatal hemorrhage.

21. Atypical. Hemorrhage into old cyst in epileptic child of fifteen years.

III. Repair.

22. Death from alcoholism four years following blow on head. Fractured skull with repeated lumbar punctures. Brain shows very extensive cystic repair of left temporal lobe and minor cysts of softening in bases of both frontal lobes.

23. Death one month following fall downstairs with fracture of clavicle and two ribs. Four months before death struck by automobile—fractured skull. Two months hospitalization. Brain showed bilateral compression, extensive on right side, due to a massive subdural hemorrhage undergoing organization, with a layer of membrane adherent to the dura and a second enclosing inner surface of clot. Compression on left due to more recent extradural hemorrhage the result of the fall one month before death. Moderate contusion and laceration of brain in right temporal lobe beneath subdural organizing clot. Remarkable deformity of brain.

24. Brain of man struck by automobile. One month in hospital—became mental. Died in State Hospital one year later from carcinoma of tongue. Subdural membrane following organization of subdural clot. Cysts of softening of basilar surfaces of frontal lobes.

25. Brain of man following fractured skull. Very extensive decompression, collapse of scalp over decompressed region and death. Moulding of brain as though by clot. Contusion and laceration along junction of base and convexity of temporal lobe, below region of decompression.

IV. Infections.

*a. Meningitis.*

26. Empyema with terminal meningitis associated with right hemiplegia. Brain showed septic meningitis, marked ependymitis, and multiple cerebral abscesses with hemorrhage into the left internal capsule.

27. Pachy- and leptomeningitis due to direct extension along inferior dental nerve to gasserian ganglion following extraction of teeth.

28. Leptomeningitis following middle ear infection. Focus of pachymeningitis extending from the base in fan-shaped area over convexity on left side.

29. Man struck by automobile. Meningitis following. Frontal fracture with dislocation of crista galli, which penetrated brain.

30. Brain of boy kicked by horse in side of head. Leptomeningitis following depressed fracture. Organism meningococcus which was also found in ear through which fracture extended.

*b. Brain abscess.*

31. Brain showing frontal abscess following left frontal sinus infection. Direct extension—extradural—through dural adhesions to pia-arachnoid.

32. Clinical diagnosis brain abscess based upon polynuclears in spinal fluid with no loss of sugar and right frontal headaches. Tap through opening in right frontal convexity showed no pus. Brain showed glioma which had spread to the ependyma of lateral ventricle, which, with the neighboring tumor tissue, had become necrotic with resulting acute inflammation and delivery of polynuclears into spinal fluid.

33. Brain showing abscess and meningitis following frontal fracture with extensive osteomyelitis of skull.

34. Brain showing abscess and meningitis following bullet wound of mastoid region.

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Abraham Myerson, M.D.*: Before discussing the various situations which Dr. Leary has brought up, it is necessary to make a preliminary statement about normal spinal fluid findings and the general pathological phenomena occurring in that medium. Whether the cerebral spinal fluid is a dialysate, with the seat of the process in the choroid plexus or scattered through the arterioles of the brain, or whether it is a secretion of the choroid plexus is not of critical importance from a clinical point of view.

A careful examination of the spinal fluid is of great importance in indicating the type of pathological process which is going on in the brain. By its pressure it reflects the general pressure conditions existing within the skull and by a careful cytological and chemical examination great light is obtained as to pathological conditions existing in anatomical relationship to the subarachnoid spaces.

Taking up the usual items examined for in the spinal fluid, one may state as follows as to normal and abnormal situations:

1. *Pressure.* The pressure must be studied by some adequate instrument and can never be estimated by the eye. The best instruments are

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the water manometers of Ayer and of Fremont-Smith. The normal spinal fluid pressure is from below 100 to 150 or 175, with the patient in a horizontal position and relaxed. Struggle, pain, and many other factors increase the spinal fluid pressure. In the relaxed patient, a pressure in the vicinity of 200 and above must be regarded with suspicion as indicating increased intracranial pressure. The cause of intracranial pressure will not be indicated, however, by the spinal fluid pressure itself.

2. *Cells.* The normal cytological content of the spinal fluid is from 3 to 5 cells per cubic mm.; these are lymphocytes. Less than this number is not of any consequence. Above this number pathology is to be suspected and especially is this definite if the number of cells is above 10. The type of cells is of great importance.

3. *Total protein content.* From 40 to 50 mgm. per 100 cc. of total protein expresses the normal. The significance of subnormal protein is not known. Excessive protein occurs under varying conditions, especially in tumor of the brain; in infections of the meninges; below a spinal cord tumor, in syphilis, of the nervous system; and in a diversity of other conditions.

4. *The sugar content* has become of great importance. Normal sugar is from about 40 to 60 mgm. per 100 cc. It is increased in diabetes and possibly in encephalitis; in other words, when the sugar content of the blood is high. Its decrease is more significant. Whenever there are organisms of an active type in the subarachnoid space or in the ventricles, the sugar content is low. As the virulence of the infection increases, the sugar content drops until it may entirely disappear.

5. *Chlorides.* The normal chloride content is 720 to 750 mgm. per 100 cc. An increase is of no clinical significance at the present time. A marked decrease is found in general bodily infections and especially in tuberculosis, so that a low chloride content with meningeal signs is with other matters very significant as diagnostic of tubercular meningitis.

Since the cases here considered are non-syphilitic the Wassermann reaction is not of importance, and for the sake of simplicity the gold sol curve is not introduced into the discussion.

With these preliminary remarks I approach some clinical considerations of case types which Dr. Leary has examined pathologically.

### EXTRADURAL HEMORRHAGES

From the clinical standpoint the cases No. 3 and No. 4 showed no especial change in the spinal fluid except increased pressure. Prolonged increased pressure with the other change and with the clinical signs present, namely, unconsciousness after accident or injury, should awaken suspicion of extradural or subdural hemorrhage. In case No. 4, the classical hemiplegia with unconsciousness was sufficient ground for an earlier exploration of the skull. (I am leaving the subdural hemorrhages for discussion by Dr. Hodgson.)

The group of subarachnoid hemorrhages has become of considerable interest and importance in recent years. The essential type of subarachnoid hemorrhage comes on with severe pain in the head, is often associated with unconsciousness, and with the syndrome of meningeal irritation, namely, stiff neck, double Kernig sign, often associated with changes in reflexes and Babinski. The spinal fluid examination in these cases always shows free blood which gradually disappears as the patient recovers.

The fluid undergoes a transition of color from the bright red of recent hemorrhage to the faintly yellow just prior to the complete absorption of the pigment in the spinal fluid. The white cells become disproportionate in amount but gradually disappear.

Case No. 14 of Dr. Leary's group, however, is one in which the diagnosis of essential subarachnoid hemorrhage was made, and is one in which a careful consideration of the facts would have shown that we were dealing with a hemorrhage due to some other source. Here the onset was sudden; the spinal fluid showed the picture above depicted, namely, 780,000 red cells, 900 white cells. There was an initial spinal fluid pressure of 500. As successive taps were done once or twice a day the red cells disappeared and the white cells became diminished. But what escaped our attention was the fact that the spinal fluid pressure remained very high. This does not occur in essential subarachnoid hemorrhage and should have indicated that there was a clot or pressure somewhere not connected with the subarachnoid space. In this case it proved to be a hemorrhage associated with a fractured skull. For some reason or other the governing aphorism which controls the physician's conduct in cases of persons found unconscious, namely, x-ray picture of the skull, did not govern in this case, and so the fracture and associated brain injury were missed.

The group of cases which I next consider is under the heading No. 4 of Infections. The important spinal fluid considerations in these cases are; first, the increased pressure which ranged from 250 to 350. The total protein increase was considerable in some cases and not of great consequence in others. The important differentiating sign in these cases is in the sugar content of the spinal fluid. In all these cases it was low and in all of them it became gradually lower until death supervened. In other words, an important diagnostic and prognostic sign in leptomeningitis is the decrease in spinal fluid sugar which indicates that organisms are growing in the spinal fluid, using up the sugar. Whether or not organisms can be demonstrated, the low sugar content speaks eloquently of their presence and the decrease of the sugar is more important

than the apparent clinical signs. In other words, if a patient seems somewhat better but if his spinal fluid sugar content is dropping, the prognosis is poor.

The cases in this special group indicate a diversity of routes by which the infecting organism may reach the brain and subarachnoid space. In one case the infection was undoubtedly hematogenous; in another, passed along channels leading from the mouth to the brain; in a third, followed from the middle ear to the brain; in a fourth, there was direct infection through a compound fracture of the skull; in a fifth, the meningococcus found its entry into the subarachnoid space through a trauma which opened up a route from the middle ear to the meninges.

The treatment of meningitis at present is unsatisfactory, largely I think because the routes of treatment are not adequate. It seems to me that to regard the subarachnoid space in the meningitis as an abscess cavity, to trephine and to wash the subarachnoid space would be of some value. Some years ago Halloran and I introduced the carotid artery route for the treatment of general paresis and recently Kolmer has used this route for the treatment of pneumococcus meningitis.

The last group of cases considered in this series, namely, the brain abscess, offers very many difficulties in diagnosis. Spinal fluid findings are not very conclusive except in so far as there is a meningitis associated with the abscess. In the uncomplicated brain abscess the only spinal fluid finding of importance is the increased pressure in the fluid. The sugar and protein content and chlorides are always negative. There may be a slight cell increase. It is not usual for the cells to be many however.

In the first case there was a very typical frontal abscess as evidenced by facial weakness on the opposite side and some degree of reflex activity. The fact that there was a frontal sinusitis, which had extended to the frontal lobe, made a clean-cut diagnostic picture, which unfortunately was missed by an experienced clinician.

Case No. 32 shows how the spinal fluid findings, however, may be interpreted logically and yet be wrong from a clinical standpoint. In this case, the presence of a large number of cells in the spinal fluid of the polynuclear variety, together with normal sugar and protein content, and some increased pressure, together with focal signs pointing to the frontal lobe, brought about a diagnosis of right frontal abscess. On autopsy a glioma was found, which had extended to the ventricular wall with necrosis and inflammation, caused a secondary meningeal reaction and brought about the spinal fluid picture.

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JOHN S. HODGSON, M.D.*: At present the majority of cases of cranial and intracranial injury are treated non-surgically by careful and repeated observation and the use of lumbar puncture and hypertonic solution. Experience with both radical and conservative treatment has shown that better results follow the latter course. However, there is a certain group that clearly calls for surgical intervention, and it is necessary to recognize these cases and treat them at the proper time.

It has often been stated that in head injury the trauma to the intracranial contents is more important than that to the cranium itself. This is generally true, but sometimes the bony injury may require more immediate attention and have greater consequence.

I shall cite six types of cranial and intracranial trauma in which operative interference is usually necessary.

First, compound fracture of the skull obviously calls for surgery. This should be done as soon as shock has been dealt with, and after a careful neurological examination, the taking of x-rays and, if indicated, diagnostic or therapeutic lumbar puncture. Operation should be done before infection has had a chance, but not until a careful estimate of the entire intracranial condition has been made. The question of focal or general increase of intracranial pressure must be determined as in any other type of head injury. Compound fracture wounds require the most thorough debridement, examination of the dura, search for indriven particles of bone, foreign bodies or clot, and their removal. These wounds should be so thoroughly cleansed and hemostasis should be so complete that closure may be made without drainage or if drained, for not over forty-eight hours.

Secondly, simple depressed fracture of the skull generally calls for operation. Occasionally, if the depression is very slight as determined by x-ray, if in a location not likely to produce epilepsy, and if there are no focal or general signs of irritation or pressure, operation may be omitted. Should epilepsy, either generalized or Jacksonian, later develop, the untreated depression may be blamed. If operation is done it is wise to wait until the patient's condition has improved; it should not be done until x-rays have been taken, as these are the best means of determining the presence or absence and degree of depression. Operation should include not only the elevation of the depression, but also exploration beneath the bone for blood clot and spicules of bone. The depressed fragment may have to be removed for this purpose, but it should be replaced if possible.

Thirdly, hemorrhage from the middle meningeal artery always calls for operation as early as possible. The diagnosis should be made if a history is obtained of a localized blow to the side of the head over the temporal bone followed by unconsciousness, lucidity, then increasing drowsiness, aphasia, and unilateral twitchings or Jacksonian attacks. The presence of such

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unilateral signs as convulsions, increased reflexes and paresis or paralysis is confirmatory. It has been stated that spinal puncture is contraindicated because dangerous in these cases; the hemorrhage, coming from a fairly large artery, collecting outside the dura, is said to increase following removal of cerebrospinal fluid by lumbar puncture. This may be avoided I believe, if it is borne in mind that the hemorrhage being extradural, the cerebrospinal fluid will be under increased pressure but clear. This finding is confirmatory if middle meningeal hemorrhage and cerebrospinal fluid is not removed. Instead, immediate decompression, with removal of clot and ligating of middle meningeal artery, is performed.

Fourthly, subdural hematoma calls for operation. This term is used to designate a traumatic collection of blood between the dura and the arachnoid. The blood may be fluid, clotted or organized into a membrane. The hematoma is surrounded by a membrane. On the side toward the arachnoid the membrane is thin and covered with mesothelium and is not adherent to arachnoid. On the dural side the membrane is thicker and is composed of organizing granulation tissue containing large mesothelium lined spaces surrounding blood and fibrin. The membrane is slightly adherent on the dural side. The source of these hematomas may be from vessels in the pia-arachnoid but it is often obscure. The question as to whether they represent persistent slow or repeated hemorrhage is also not settled. Organization begins chiefly from the dural side. The history in this type of case is highly suggestive, almost as typical as in middle meningeal hemorrhage, but because the condition is uncommon and not known about as widely as the former it may easily escape detection. The head injury may be slight, consciousness may have been retained or only momentarily lost, and the patient's condition may at first seem satisfactory. Spinal puncture may show xanthochromic fluid under normal or slightly increased pressure. At first one may consider that there has been subarachnoid hemorrhage, that is the usual type of traumatic hemorrhage into the subarachnoid space. Instead of improving, however, as does the latter ordinarily, the patient may remain drowsy, irrational, or complain of increasing headache. Localizing signs may develop, though not always, and the eye grounds may begin to show increased intracranial pressure. Further spinal punctures may reveal failure of the cerebrospinal fluid pressure to return to normal; it may be higher than normal on each succeeding day, despite its having been reduced to normal on each day, or it may actually gradually increase. Such a course may consume a few days, weeks, or months. If unrecognized serious or fatal increase of intracranial pressure may result. The treatment consists in operation, either with decompression and removal of blood or membrane, because spinal puncture has no lasting value, or by osteoplastic flap with wide removal of membrane. Should membrane be left behind progression of the hematoma may occur.

Subdural accumulations of fluid sometimes occur, causing focal and likewise general increase of intracranial pressure. It is believed that in these cases the intracranial trauma is accompanied by tearing of the arachnoid, thus permitting the escape of cerebrospinal fluid and often some blood from the subarachnoid space where the fluid normally circulates, into the region between the dura and arachnoid. Normally this space contains very little fluid and plays no active part in cerebrospinal fluid circulation. On lumbar puncture one may find increased intracranial pressure of varying degree and the fluid may or may not be bloody, depending upon the amount of subarachnoid bleeding and upon the degree of communication between subarachnoid and subdural spaces. Operation consists in decompression with release of focal pressure producing fluid accumulation.

The last type of intracranial injury which may call for operation is that producing acute rapid rise of intracranial pressure and frequently resulting in death. On admission the patient may be unconscious or semiconscious, there may be no localizing signs, and spinal puncture shows increased intracranial pressure, sometimes slight, again considerable. The prognosis at first may not seem grave or hopeless and it is decided to wait and puncture again. After several hours the clinical course becomes adverse and subsequent punctures reveal further increase of pressure. The need of surgery becomes apparent but often too late. There is in these cases either continued hemorrhage or steady increase in brain volume from contusion, laceration, or hemorrhage. This condition is not always appreciated soon enough, but to be dealt with successfully it must be recognized early and subtemporal decompression done right away. Spinal puncture alone, or in conjunction with hypertonic solution does not suffice, but if combined with operation is the best form of treatment and may result in saving an occasional case otherwise certain to die. In this connection there is need of early and frequent lumbar puncture, as intracranial pressure is one of the best ways of determining the progress of the case. Puncture should be performed every hour or two until the course seems established. Spinal fluid pressure readings may give earlier signs than clinical findings.

## Discussion

Dr. Duncan: I am afraid my discussion of this subject will be about as successful as the German who shot to the sky. It will be far from hitting the mark. I think it does show one thing that will make us think, and that is the value

of these specimens exhibited here today which mean years of thought and work. It also means a larger field for the profession to work in, and I want to add to Dr. Smith's remarks, and express my appreciation of the fine demonstration we have had from the three doctors.

I think also that we ought to take to heart the essay on the examination of the cerebrospinal fluid, and if we have not facilities for doing these things we ought to be able to work them up. This sort of work requires considerable knowledge of anatomy and physiology, and I know Dr. Stewart, who is a physiologist and who will follow me, ought to be able to give us some very important points on the subject.

Dr. Colin C. Stewart, Hanover: The advantage in leading a discussion is that one can be among the first to congratulate the speaker on the success of his presentation and the value of his material. There is no clinician for whom the Physiologist has more respect than for the Neurologist. In most fields of medicine the Physiologist does pioneer work, and his results pave the way for clinical practice. This however is not true in the case of Clinical Neurology.

One hundred years ago Bouillaud and Broca gave clinical evidence for the localization of the speech center. In spite of this, physiologists, misled by negative results with some of the lower types of experimental animals, clung to the idea of diffuse distribution of "Faculties"; and it was not until 1870 that Fritsch and Hitzig, surgeons in the Franco-Prussian War, presented their clinical evidence, that cerebral localization became an accepted fact. The countless physiological experiments since that time have yielded information that is complete in all details but one—the matter of localization in the human brain.

There have been outstanding contributions from the physiologists along other lines. Sherrington's masterly study of reflexes has been of great value. We know that a spinal dog recovers first his flexor reflexes then crossed extension, the extensor thrust, the complex scratch reflex, and a large degree of postural coördination. But we did not know until the great war that the spinal man recovers only the first and simplest of these reflexes, to be followed by an incoördinated mass reflex in which flexion of the whole body predominates.

We assumed that coördination in man is moved farther up than the spinal cord, but we did not know where, until the clinical neurologists analyzed the cases of epidemic encephalitis, and detailed the functions of the striate bodies and related gray matter.

Pawlow's (Pavlov's) work on conditioned reflexes is another outstanding example of physiological research on the nervous system. But it resolves itself into an accurate quantitative study on a simply organized animal, of what we used to know as the association of ideas. And I would predict that many of the conclusions, especially with respect to inhibition are subject to revision.

The physiologist's difficulty lies in the fact that he must work with the lower animals, and however excellently he may work in the field of neurology his conclusions cannot safely be interpreted as applying to the human animal.

That is why all good experimental physiologists hope, when and if they get to Heaven, to become clinical neurologists.

Dr. John F. Holmes, Manchester: In years gone by as I listened to Dr. Leary at the Medical School, day after day, trying to absorb his words of wisdom I learned to appreciate how truths and facts may be imparted in a few words, for that is one of his characteristics and I further learned by his example that sincerity of purpose and a willingness to work combined with a brilliant mind makes for success. I learned with the other students to admire and respect Dr. Leary as a great teacher and a true friend. To discuss a subject which he has presented is indeed an honor.

It was my privilege to attend medical school with Dr. Myerson and I therefore became early acquainted with his remarkable student ability. He is one of the few men of Tufts who acquired a summa cum laude degree. Dr. Hodgson's associations and the able manner in which he has presented his sentiments warrant the stamp of high approval.

In attempting to discuss this subject which has been so splendidly and so thoroughly given I find myself in an embarrassing position. The late Henry Ward Beecher, under similar circumstances read the subject given him and then remarked, "I shall make no further reference to it." He then proceeded to talk of a matter with which he was familiar and so I feel that I should make no further reference to the subject under discussion. There are, however, a few points which, for lack of time have not been emphasized and which I may be pardoned for mentioning.

Let us consider the case of head injury as it comes to us for immediate treatment. It may be at a time or place where expert neurologists, brain surgeons and diagnosticians are not available. In any event the temperature in head injuries is important and in early injuries it should be taken every one or two hours. In extensive brain damage there is an immediate rise in temperature; if the temperature rises high and continues to rise it means very extensive brain damage and it is not much use to consider any of the operative measures upon the brain for the patient will die from brain damage already done.

Lumbar puncture is a procedure easy of accomplishment and of distinct value when indicated in cases of head injuries. Magnesium sulphate, saturated solution, per rectum may be

given in any case very easily. It acts by depleting and lowering the intracranial pressure.

In these serious head injuries which occur at points where trained neurologists are not available, much can be accomplished by an immediate telephone consultation with an expert at one of the larger medical centers and in this way one can receive at long distance advice as to the early handling of the case, which in some instances is of inestimable value.

In the treatment of slow hemorrhage, from any source one may well consider the administration of calcium chloride intravenously, fifteen grains in a ten c.c. solution; and the administration of calcium lactate orally in large doses, as one teaspoonful every four hours.

May I again express my appreciation of the presentation of this subject, Traumatic Head Injuries, by this remarkable trio of experts; and congratulate the New Hampshire Medical Society upon the accomplishment. In closing I will ask this question: In traumatic head injuries what per cent. of cases develop mental symptoms — mental disturbances afterwards— and what per cent. of head injuries have no symptoms following immediate recovery?

PRESIDENT SMITH: I will ask Dr. Leary to answer Dr. Holmes' question.

DR. LEARY: So far as clinical questions are concerned I do not pretend to be au fait, but I am going to ask Dr. Hodgson to answer this clinical question as to what the percentage is.

What I want to rub in here is that here is a problem put up to the medical profession. Generations ago we did not get these head injuries. We got the falls downstairs and that sort of thing, and the number of head injuries was very much less than it is today. Here is a problem put right up to our profession. I think we are groping in the dark with our present methods of handling this situation. The average general practitioner avoids it. He gets out from under. He calls for help from the outside, and whether the evidence that is going to be of help is going to come from experimental observation or from clinical observation I do not know. I cannot help believing there are certain things we ought to do. When the mortality from meningitis due to these various organisms, as Dr. Myerson has said, is 100 per cent., then the medical profession ought to be ashamed of itself. Pus anywhere else in the human body is treated as a surgical matter, and we are still treating meningitis as a medical problem, and that is all wrong.

As has been said, we can handle streptococcus infections in the chest fairly well, but the moment the streptococcus gets into the meninges that moment you get ready to sign the death warrant of the patient under present conditions. I think that is all wrong. In the early days of antiseptic surgery we learned we could go into the belly, and we took out thousands of ovaries unnecessarily because we learned that any fool could make a hole in the belly and extract a tube or ovary. That has been done away with. Then the war taught us we could go into the chest in spite of its bony wall and do successful surgery in the chest. So far as the skull is concerned I think we are only beginning to approach the subject, and I think some day when we get over our scare of going into the head and improve our methods, as we must, of operation on the head, there will be a limited number of cases which we cannot handle. But what I want to do is to interest the profession in progressive movements and to assist the men who are leaders in the movement toward tackling this present problem intelligently.

DR. MYERSON: I just want to answer Dr. Holmes' question. I do not think anybody knows the percentage of patients that recover. I mean patients with mental symptoms, actual psychoses, actual mental diseases of the type that requires hospital incarceration. An individual with mental deterioration operates at a lower level for the rest of his life. He is not as energetic, keen and able as he was before the accident. A serious blow, an injury to the brain tissues may result in an individual who was in many respects normal before the accident, and when you study him you find that after the accident he operates at a lower level, so that the net results are had from the standpoint of the man.

Then there is that great problem of the traumatic neuroses with which every man who deals with industrial accidents is concerned. There are two attitudes towards that. One is you are dealing with a malingerer who is trying to get compensation. Since I operate for both insurance companies and plants I am impartial. I think a great many cases of traumatic neurosis represent an effort on the part of an individual trying to get compensation, and I think it is as inevitable that that should happen as it is, for example, that I wear a necktie. I do not want to wear a necktie but it has been forced on me, and so the individual who has been injured is forced by social pressure into a condition which results in traumatic neurosis. Furthermore, work has been done which shows that many a man who is accused of having a simple traumatic neurosis following a head injury actually has an organic disease begun which may develop into an ear infection, because when you follow those cases you find post-traumatic changes in the subarachnoid space and in the ventricle and so forth. So that post-traumatic neurosis is not a closed book by any means, and it represents a mental disease of a serious type and in some cases represents a disease of actual organic injury.

My feeling is this. There are some cases of severe brain injury that recover completely, apparently. That occurs in individuals who oper-

ate in life at a low level, who have a low grade of work to do, whose relationships to life are not complex. When any man has a severe brain injury and has complex work to deal with, he is a damaged individual.

## MISCELLANY

### NEW MEMBERS

Abbott L. Winograd, 215 Main Street, Nashua.
Fred N. J. Dubè, 177 Main Street, Nashua.
Albert E. Barcomb, Farmington.
Norman Kelley Chesley, Rochester.
Herbert H. Purington, Somersworth.
Edward W. Anderson, Hanover.
Leslie K. Sycamore, Hanover.
Harry W. Savage, Lebanon.

### REMOVAL

Henry L. Clow from State Hospital, Danvers, Mass. to Metropolitan State Hospital, Waltham, Mass.

### NEW HAMPSHIRE TUBERCULOSIS ASSOCIATION

The State of New Hampshire leads a group of twenty states in having the largest reduction in the death rate from tuberculosis according to the latest tuberculosis statistical survey, which has just been completed. This decline in New Hampshire represents a decrease of 76 per cent. in the cities and 41 per cent. in the rural districts of the state.

The reduction in the tuberculosis death rate for the states, as a whole, during the past twenty years is slightly over 62 per cent. The states studied represent all sections of the country and include California, Colorado, Connecticut, Indiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Utah, Vermont, Washington and Wisconsin.

The states that had increases in tuberculosis death rate in the rural districts are California with 10 per cent. increase; Massachusetts with 4; Montana with 6; New Jersey with 34; and Rhode Island with 150.

Of particular interest is the fact that New Hampshire not only leads with the greatest percentage of reduction for the state as a whole, but that the reduction in the rural communities is correspondingly gratifying.

Referring to the rural district the survey states: "These figures must be interpreted in the light of several conditioning factors. Being crude rates they do not take into consideration the item of non-resident deaths. Again many tuberculosis sanatoriums have been established within the last 20 years. Most of these are located in the rural districts and many deaths from tuberculosis have occurred within them. These deaths, obviously, are largely those of persons who actually live in the cities, but whose deaths are counted in the rural totals. Important as is this conditioning factor, the improvement shown for the cities is so very much the larger that there can be no doubt that in city population the decline in death rate from tuberculosis has been greater than in the rural districts."

The success of the tuberculosis work in New Hampshire is due largely to the untiring efforts of Dr. Robert B. Kerr, Executive Secretary of the New Hampshire Tuberculosis Association, under whose guidance and forethought the work is being carried on. Governor John G. Winant is the President of the Association.

### EXCERPTS FROM THE *BULLETIN OF THE NEW HAMPSHIRE STATE BOARD OF HEALTH*

#### PASTEURIZATION OF DAIRY PRODUCTS

One of the laws enacted during the current legislative session authorizes the State Board of Health to make regulations governing the pasteurization of dairy products. The text of this law is as follows:

"*Pasteurization Regulated.* The State Board of Health is empowered to adopt regulations governing the pasteurization, or other processing for the same purpose, of milk, skimmed milk, and cream, and concerning the production, distribution, labeling and sale of products so treated, and to be so treated. Any violation of these regulations shall be punishable by a fine of not less than ten nor more than one hundred dollars."

"*Enforcement.* It shall be the duty of the state and local boards of health to enforce the provisions of sections 32 to 38, inclusive, relating to the adulteration, quality and processing of milk and of other dairy products."

It will be noted that this law applies not only to milk and cream but to the pasteurization of skimmed milk as well. Considerable quantities of skimmed milk are delivered to dairymen for animal feeding, and in connection with the program for bovine tuberculosis eradication the demand is that such milk product shall be pasteurized. That this is being done very inadequately in some instances would appear from inspections showing that at some plants the temperatures applied are far below that necessary for the destruction of tubercle bacilli.

The number of plants in this state producing pasteurized milk and cream, while not large, is steadily increasing. It is the purpose of the regulations now in preparation to insure to the consumer that the legend "pasteurized," as appearing upon a bottle of milk or cream, shall mean just what the name implies, viz., a clean low-bacteria count product produced under good sanitary conditions, effectively pasteurized and subsequently so handled as to guarantee a maximum of safety.

#### NOTES

Percentages of deaths which occurred in New Hampshire during 1929 show that 71.06 per cent. were over fifty years of age and that 59.95 per cent. of this group were over sixty years of age.

10.59 per cent. of the deaths occurred in those between thirty and forty years of age.

9.39 per cent. of the deaths occurred in those between one and thirty years and 8.6 per cent. occurred in infants under one year of age.

Licensed Juvenile camps listed in New Hampshire during the 1929 and 1930 seasons were 201. Of this number fourteen were not licensed in 1930, and in-

cluded in this number are fifteen camps which were licensed for the first time in 1930. Five camps listed are adult camps.

NEW HEALTH LEGISLATION

An Act passed by the present legislature is important to the town and may help to solve the question of lack of physicians in small towns.

Neighboring towns may now each make appropriations for joint support of some physician to reside in one of the towns. They may also make appropriations for the "aid of a hospital or clinic or health center" to be located in one of the towns. Also, "upon the recommendation of the selectmen of each of several towns, the State Board of Health may in its discretion appoint" a health officer to serve the several towns to receive compensation from each town as the selectmen shall determine.

BACTERIOLOGICAL DEPARTMENT

For two months ending March 31, 1931, the bacteriological department made 1544 examinations. Positive findings were made for diphtheria, 14; for typhoid, 4; for tularemia, 52; for gonorrhoea, 81; for syphilis, 109.

150 examinations of tissues were made for pathological diagnosis.

2,597 outfits were forwarded to the profession for these examinations by the state.

## RECENT DEATH

Dr. James A. Craig, Westmoreland, died suddenly April 10 in Keene.

## NEWS ITEM

Surgeon J. W. Mountin, U. S. P. H. S., has been directed to proceed from Washington, D. C. to Manchester, N. H. for the purpose of delivering an address at the Kiwanis Club on May 11, and the Manchester Medical Association; in proceeding to Manchester or in returning therefrom directed to stop en route at Boston, Mass. and New Haven, Conn. to confer with the health authorities in those places. April 28, 1931.

## EXCERPTS FROM BULLETIN OF THE COMMITTEE ON THE GRADING OF TRAINING SCHOOLS FOR NURSES

(Continued from page 980)

symptoms, particularly of those which might lead to the serious complications that are often a feature of such illnesses, require intensive observation and experience with varieties of cases.

The following gives a picture of the nine states which together produce more than half of all the graduate nurses in the United States. The data are for the 1928 graduates, or one year's graduates only.

37 out of 70 Massachusetts schools graduated 477 nurses who had no communicable disease service experience.

74 out of 113 New York schools graduated 1,453 nurses who did not have this experience.

87 out of 129 Pennsylvania schools graduated 1,142 nurses who did not have this experience.

25 out of 66 Ohio schools graduated 436 nurses who did not have this experience.

52 out of 81 Illinois schools graduated 678 nurses who did not have this experience.

22 out of 37 Michigan schools graduated 272 nurses who did not have this experience.

18 out of 38 Minnesota schools graduated 443 nurses who did not have this experience.

21 out of 32 Texas schools graduated 187 nurses who did not have this experience.

23 out of 48 California schools graduated 410 nurses who did not have this experience.

Reports from the remaining states show that a similar condition exists in practically every one of them.

The National League of Nursing Education is working to have communicable disease service included in the list of essentials for state board examinations.

## ADDITIONS TO THE MICHAEL REESE HOSPITAL

Formal dedication of the new nurses' residence and internes' home at the Michael Reese Hospital (Chicago) took place Thursday, April 30, at 8 P. M., in connection with the fortieth annual commencement exercises of the Michael Reese Hospital School of Nursing.

The nurses' residence and internes' home is a seven-story structure erected just north of Twenty-ninth Street between Ellis Avenue and Cottage Grove Avenue. It occupies the site of the old Hahnemann Hospital and is a notable addition to the Michael Reese group.

It includes an auditorium, the gift of Mr. and Mrs. Maurice L. Rothschild. The auditorium has a seating capacity of 342 with projection facilities for stereopticon slides and moving pictures. It will be used for general assemblies of the school, lectures, and demonstrations of nursing procedures. A complete set of equipment for instruction in all branches of nursing has been installed.

The internes' home, a part of the unit, is the gift of Mr. and Mrs. Milton S. Florsheim. It has accommodations for fifty internes and it includes a library and a recreation room with facilities for billiards and cards, and a handball court.

Eight rooms in the new education section are the gift of the late Ernst Stein. Materially increased facilities for teaching have been installed. Among these are new classrooms, instructors' offices, dietetic laboratory, nursing practice laboratory, and study hall. A swimming pool is part of the nurses' home and a recreation hall with a large fireplace at one end adds to the recreational facilities. The new building provides for 235 additional beds for the use of students and graduate staff.

Fifty-eight nurses composed the graduating class this year. Two of this group were the recipients of scholarships in recognition of outstanding work done during their undergraduate period.

Speakers at the commencement exercises were Rear Admiral N. J. Blackwood, medical director of Provident Hospital, and Dr. Julius H. Hess of the Michael Reese staff. Maurice L. Rothschild presented the diplomas.

# MEDICAL PROGRESS

## PROGRESS DURING 1930 IN MEDICINE AND PUBLIC HEALTH

BY HARRY H. MOORE, PH.D.*

APPARENTLY, no great group of people of modern times has enjoyed better health than did the people of the United States during 1930. Considering the business depression and the drought, this appears surprising; but there is considerable evidence to support the statement. While economic depression and drought doubtless tend to lower the resistance of the people and increase the prevalence of disease, such effects in this case did not become conspicuous during the calendar year. Unfortunately, 1931 may have a different story to tell.

Changes and developments of significance may be considered under the following topics: mortality and morbidity statistics, public-health measures, private practice, hospitals and clinics, legal measures, biological and chemical research, and research in medical sociology and economics.

### MORTALITY AND MORBIDITY STATISTICS

The records for approximately 19,000,000 industrial policyholders of the Metropolitan Life Insurance Company in the United States and Canada must be used as an index of trend among the people generally; the official figures for any given year are never available early the following year. The Metropolitan death-rate for 1930 was 6.6 per cent. less than in 1929, and 1.1 per cent. less than in 1927, the lowest rate which had then been attained. Presumably the 1930 official rate for the United States was below 11.9 per thousand population, the rate for 1929. This record for 1930 is all the more remarkable considering the unfavorable business conditions which prevailed. The 1930 tuberculosis death-rate for Metropolitan policyholders was lower than ever before; the typhoid-fever rate was identical with that of 1929, and for measles, scarlet fever, whooping cough, and diphtheria a remarkably low mortality-rate for the year was achieved. While there was a slight increase in the cancer death-rate for the year, there was no change in the rate for diabetes, and there was a decline in the rates for both heart disease and chronic nephritis.

The infant mortality-rate of the registration area for 1929 (made available in 1930) was 68 per thousand livebirths—lower than the 69 rate for 1928, but higher than the rate of 65 for 1927 which was the lowest point reached in the history of the United States.

In respect to the incidence and prevalence of sickness during 1930, very few data are available at the time of writing. There was no unusual prevalence of influenza during 1930. Contrary to what might have been expected, there was no convincing evidence of an increase in hookworm disease and malaria. The incidence of smallpox increased from 1927 to 1929, and there were no indications that the trend was stopped during 1930; yet this disease resulting in an incalculable amount of suffering could, in a large degree, be prevented by a simple, well-known measure. There was an outbreak of psittacosis, popularly known as "parrot fever"; 169 cases and 33 deaths were reported. While plague-infected rodents were found in California during the fiscal year ending June 30, 1930, no human case of plague developed. Yellow fever appeared nowhere in the United States.

The death-registration area was increased by the addition of South Dakota, leaving only one state, Texas, now outside the area. The birth-registration area remained the same, with forty-six states included.

### PUBLIC-HEALTH MEASURES

The White House Conference on Child Health and Protection took place in November, with 3,300 persons attending. They met in the hope, as expressed by Dr. Ray Lyman Wilbur, chairman of the Conference, that they might "bring up the general level of child care to the point reached by the outposts of science and weighed social experience". President Hoover told the Conference that the problems before it should stir a nation and merited the attention of statesmen and governments. He continued, "If we could have but one generation of properly born, trained, educated, and healthy children, a thousand other problems of government would vanish. We would assure ourselves of healthier minds in more vigorous bodies, to direct the energies of our nation to yet greater heights and achievement. Moreover, one good community nurse will save a dozen future policemen."

The coöperation of the United States Public Health Service with other governmental agencies engaged in public-health work was made possible by an act of Congress approved April 9. A National Institute of Health was created by another act; it will absorb the Hygienic Laboratory, will greatly stimulate the cause of scientific research, and will enable the government to assume leadership in many fields. This act authorized the Service to accept donations, and within a short time a grant of $100,000 was

*Moore—Director of Study, Committee on the Costs of Medical Care. For record and address of author see "This Week's Issue", page 1004.

made by the Chemical Foundation. The Public Health Service was authorized by Congress to provide medical care in federal prisons, and in accordance with another new law, the Narcotics Division of the Public Health Service was enlarged in scope and became the Division of Mental Hygiene. While a few years ago the Public Health Service had available only $50,000 a year to encourage, through the granting of subsidies, the establishment of county health departments with whole-time medical officers in charge, for the fiscal year 1930-31 the sum of $338,000 is available for this purpose.

A public-health survey was made in the state of Maine by the National Institute of Public Administration resulting in the proposal that health work, welfare activities, and certain institutions be merged into one major department. This recommendation has raised an important issue, for such consolidation seems not to be approved by some health authorities. The Ohio and Missouri state departments of health during the year organized bureaus of dental hygiene.

Conspicuous among developments in municipal health departments was the diphtheria-immunization program of the health department in Detroit. General practitioners immunized children, the health department paying a flat rate of fifty cents per inoculation. A house-to-house canvass was made by the health-department nurses to urge parents to take their children to practitioners. A new journal in the public-health field called *Municipal Sanitation* published its first issue early in the year. Abel Wolman is the editor.

The Interchamber Health Conservation Contest inaugurated by the Chamber of Commerce of the United States was so successful in 1929 that it was continued in 1930. Cities participating were graded upon accomplishments in public-health activities. At the spring meeting of the Chamber of Commerce in 1930 awards were presented to the winning cities for 1929 in various population groups. The winners were as follows: for Class 1 cities, Milwaukee, Wisconsin; Class 2 cities, Syracuse, New York; Class 3 cities, East Orange, New Jersey; Class 4 cities, White Plains, New York; Class 5 cities, Sidney, Ohio.

For mental hygiene 1930 was a banner year. The First International Congress on Mental Hygiene was held in Washington in May. Representatives of fifty-four countries attended, and widespread interest was aroused by the meetings. At the annual meeting of the American Medical Association three resolutions were adopted—one which created a special committee of the Association to concern itself solely with the problem of mental disease and its prevention; a second which provided for a study by the Association of hospitals, laboratories, and research facilities for the care of the mentally sick; and a third which advocated psychiatric services in criminal courts and prisons. At the twenty-first anniversary meeting of the National Committee for Mental Hygiene the appointment of a new director, Dr. C. M. Hincks, was announced.

The problems of social hygiene were considered to an increasing extent during the year in connection with other fields of activity and other social and health movements. In the American Social Hygiene Association there was established a new Division of Family Relations.

The Noise Abatement Commission of New York finished early in the year a noise survey of that city. Apparently noise has become an important public-health problem. Business firms, realizing the disturbing effect of noise on workers, spent during the year over $3,000,000 in attempts to subdue office noises and exclude street noises.

Two new foundations interested primarily in medicine and public health were created during 1930—the Josiah Macy, Jr., Foundation, and the W. K. Kellogg Foundation. The former will encourage studies in various sociologic and economic problems in the fields of medicine, and the latter is promoting health work in rural schools.

The Milbank Memorial Fund terminated its rural and urban health demonstrations in the state of New York, and a scientific appraisal was made of the health program developed by the Fund in Cattaraugus County. Henceforth, the Milbank Fund will give greater emphasis to research. The Julius Rosenwald Fund in coöperation with the United States Public Health Service inaugurated studies in the prevalence of syphilis and experiments in the practical control of the disease in certain rural areas in the South. Dr. George E. Vincent, who retired from the presidency of the Rockefeller Foundation at the end of 1929, was succeeded by Dr. Max. Mason. A reorganization was completed during the year of the extensive medical and health activities of this organization.

With the aid of the Commonwealth Fund the Massachusetts and Tennessee departments of health were active in the development of rural health units with whole-time medical officers in charge. In Massachusetts one unit comprises fifteen towns and another fourteen. Scholarships were offered to practitioners more or less isolated in these rural districts, in an effort to keep them up to date with advances in the science and art of medicine.

The Carnegie Corporation, the Murry and Leonie Guggenheim Foundation, the New York Foundation, the Russell Sage Foundation, the Twentieth Century Fund, and other foundations from which reports have not been received continued their various pioneering efforts in the promotion of medical and public-health practices.

### PRIVATE PRACTICE

While in various sections of the country new projects received special attention during the

year, approximately 143,000 physicians, 75,000 dentists, and 200,000 trained nurses were quietly at work day by day administering to the sick, and, to an increasing extent perhaps, were giving attention to the prevention of disease in their private practice. There was an increase in the number of physicians, the American Medical Association reports, but the extent thereof is not yet known. No new figures are available regarding the number of dentists and the number of nurses in the United States.

A Bureau of Medical Economics was created by the American Medical Association during the year; and the American Dental Association appointed a committee to prepare plans for a Bureau of Dental Economics. The Chicago Dental Society, in coöperation with the Julius Rosenwald Fund, agreed to establish a self-supporting, low-cost, ten-chair dental clinic in Chicago. The American College of Dentists assumed financial responsibility for a study of compulsory health insurance at an estimated cost of $15,000.

In the field of nursing, registries were being organized on a sounder basis and a few important ones became true bureaus of nursing service. Two schools of nursing received grants from the Rockefeller Foundation. Hourly nursing service in Chicago was encouraged by a subsidy from the Julius Rosenwald Fund.

Graduates from medical schools increased in number from 4,446 in 1929 to 4,565 in 1930. The number of graduates from dental schools in 1929 was 2,442 while the number in 1930 was 1,561. Training schools for dental hygienists graduated 367 persons in 1929 and 373 in 1930. From schools of nursing approximately 25,300 were graduated in 1929 and about 26,000 in 1930.

The expulsion of Dr. Louis E. Schmidt from the Chicago Medical Society, which has created much interest among physicians and the public, was sustained by a decision of the Judicial Council of the American Medical Association. A dissenting statement prepared and submitted to the Council by two of its five members was rejected by a majority vote of the Council.

### HOSPITALS AND CLINICS

To provide additional hospital, domiciliary, and out-patient facilities for persons entitled to hospitalization under the World War Veterans' Act, another congressional authorization of approximately fifteen million dollars was approved by the President a few days before the beginning of the year 1930. By an act approved in May, construction was authorized of a hospital for the care and treatment of all persons charged with or convicted of offenses against the government who are or shall become insane, afflicted with an incurable or degenerative disease, or so affected mentally or physically as to require special medical care or treatment not available in an existing federal medical institution.

The citizens of New York voted in November their approval of a second fifty-million-dollar bond issue for the construction and development of mental-disease hospitals and correctional institutions to relieve the greatly overcrowded conditions from which these institutions have been suffering.

For the aid of hospitals maintained jointly by two or more counties or cities which conform to certain requirements of the state department of health, a hundred thousand dollars was appropriated by the Virginia legislature. Kentucky cities of the first class were authorized by a new law to construct public hospitals. In Mississippi a new law authorized any municipality of not less than five thousand population, and the county in which it is located, jointly to establish a hospital.

### LEGAL MEASURES

Only nine state legislatures convened in regular session during 1930, and no legislative measures of far-reaching importance were enacted into law. Many bills intended to strengthen or weaken the control of the state over medical practice were considered, but most or many of them apparently were not passed. In the Massachusetts legislature a bill was considered and rejected which would have created a department of public medicine to provide all citizens, without cost to them, with complete medical service. New Jersey passed a bill improving the state's control of rabies; New York enacted a law governing the donation of blood for purposes of transfusion; the Rhode Island and Virginia legislatures passed bills controlling the pasteurization of milk.

### RECOGNITIONS AND AWARDS

Dr. William S. Thayer and Dr. William H. Welch were authorized, under an act of Congress approved in April, to accept the Legion of Honor tendered to them by the French government.

On the occasion of the eightieth birthday of Dr. Welch in April, many meetings were held in various parts of the United States and in other countries as a testimonial to the many years of valuable services rendered by him in various fields of public health and medicine.

The 1930 Nobel Prize in medicine was awarded to Dr. Karl Landsteiner of the Rockefeller Institute of Medical Research for the discovery that human blood is of four different types and that blood of one type does not always mix with blood of another type. The Nobel Prize in chemistry was awarded to Professor Hans Fischer of Munich for his achievement in the laboratory production of hemin, one of the components of hemoglobin, the red coloring matter of the blood.

The Gold Medal of the American Medical Association was awarded to Dr. R. R. Spencer of the United States Public Health Service for original work in the preparation of a vaccine against Rocky Mountain spotted fever.

The first ten-thousand-dollar Popular Science annual award was shared by Dr. George H. Whipple of the University of Rochester and Dr. George R. Minot of Harvard University Medical School in recognition of their discovery of a successful treatment of pernicious anemia by the liver diet.

BIOLOGICAL AND CHEMICAL RESEARCH

The United States Public Health Service has made some valuable contributions during the year, including the finding of a new species of the meningococcus organism, the cause of meningitis. Investigators of the Service also found a phenol compound, tri-ortho cresyl phosphate, to be the adulterant which caused thousands of cases of partial paralysis from drinking bootleg Jamaica ginger, known as "ginger jake".

A hormone from the cortex of the suprarenal glands was isolated by Dr. W. W. Swingle and Dr. J. J. Pfiffner of Princeton University and used by Dr. Leonard G. Rowntree and Dr. C. H. Greene of the Mayo Clinic to treat hopeless victims of Addison's disease, in the same way that insulin affects the coma of diabetes. Dr. F. A. Hartman and Dr. K. A. Brownell of the University of Buffalo also obtained an extract of the same gland.

It was discovered by Dr. Waclaw T. Szymanowski and Dr. Robert Alan Hicks of the Western Pennsylvania Hospital Institute of Pathology that radio waves, shorter than those commonly used for sending messages, are able to weaken materially the poison elaborated by the diphtheria bacillus.

Genealogical studies at the German Research Institute for Psychiatry, at Munich, reported by Professor E. Rudin, showed that among families having one parent afflicted with manic-depressive insanity, at least a third of the children will be similarly afflicted, and another third will be otherwise mentally abnormal.

In a study of motormen involved in traffic accidents, Dr. O. M. Hall of the Personnel Research Federation found that practically half had health defects, chiefly abnormal blood pressure and hernia, and 39 per cent. had personality defects.

That a definite mark on personality is set by diseases suffered during childhood was revealed in a study, of identical twins, made by Dr. H. W. Newell of Richmond, Virginia.

RESEARCH IN MEDICAL SOCIOLOGY AND ECONOMICS

The Commission on Medical Education issued a report on a study of medical education and related problems in Europe. The Commission has decided to complete its work as rapidly as possible and to go out of existence in 1932.

The Committee on the Grading of Nursing Schools has completed a two-year survey of 1,458 schools of nursing in the United States. The results have been printed in three sections, dealing with *The Student Body, What Students Learn,* and *Who Control the Schools?* These three reports, annotated to show the standing of each individual school, have gone to some 10,500 nurses, physicians, and hospital executives and trustees connected with the schools which took part in the study. The Committee plans to make the major results of this study available to the general public in book form.

The research work of the Committee on the Costs of Medical Care reached its peak during the year. Reports, with abstracts, on the following studies were published: *Medical Care for 15,000 Workers and Their Families—a Survey of the Endicott Johnson Workers Medical Service in 1928, A Survey of the Medical Facilities of Shelby County, Indiana, in 1929,* and *Capital Investment in Hospitals.* At the end of the year numerous other important studies were nearing completion. In addition, the Committee began the publication of a series of "Miscellaneous Contributions." At the autumn meeting in 1930 the interpretative phase of the Committee's work was inaugurated, and late in the year preliminary work was begun on the final recommendations.

As these concluding words are being penned, there are indications of improved economic conditions. But through the winter there were long bread lines of unemployed men in industrial centers; thousands of men, women and children throughout the South were getting insufficient food for the maintenance of health; self-respecting citizens of Arkansas and other Southern states were dependent for weeks upon a daily cash allotment from the Red Cross, necessarily small, with which to provide a meager supply of food for their families. Unemployment and drought have been slowly but effectively leading to the lowered resistance of thousands of adults and children throughout the United States. Disease, it seems, must inevitably be advancing. A different report may be expected for 1931.

CASE RECORDS
*of the*
MASSACHUSETTS GENERAL HOSPITAL
ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

## CASE 17191

## RECURRENT PERIODS OF COMA

### MEDICAL DEPARTMENT

A married Irish-American housewife forty-four years old entered in coma on February 11. The chief complaint was of periods of unconsciousness during the past year. The history was given by her husband.

For a year she had urinated two or three times at night. A physician found high blood pressure. A year before admission she fell down ten stairs. She did not know why she fell. She was able to get up and walk up two flights of stairs, but felt weak and had difficulty in changing her dress. The only sign of injury was a bruised shoulder. Two hours later she collapsed and was found lying unconscious on the floor. She did not regain consciousness until the next day. She had complete left hemiplegia, which disappeared during a two months' stay in bed. Seven months before admission she had a second attack which lasted only a few hours and left no signs of paralysis. Four months before admission while sitting in a chair she suddenly had clonic movements of the arms and rapidly went into a coma which lasted for two hours. She stayed in bed until two weeks before admission, a period of three and a half months. The only paralysis was a slight involvement of one side of the face. During the past few weeks she had gradually become weaker. For the past two weeks she had been able to walk without any difficulty. She had been rather "thick-tongued". The day before admission while writing a letter she suddenly felt a numbness of her right hand and arm and rapidly went into coma. During the year her memory and reasoning power had rapidly deteriorated. During the past eight months she had grown very nervous and irritable. She had lost 30 pounds during the past year.

The family history so far as known is not significant.

She had had arthritis twelve years before admission for three months,—swelling, tenderness and redness of the shoulder and arm. Recently she had had bloody discharge between menses. Otherwise she had been very well for the past twenty years until the present illness.

Clinical examination showed a fairly well nourished woman in complete coma, breathing quietly, occasionally moving the left arm and leg but making no other movements. The examination was cursory. There was acne of the forehead. The heart was enlarged to the left. The apical impulse was felt in the fifth space outside the midclavicular line, which was 8 centimeters to the left of midsternum. The left border of dullness was 9 centimeters to the left of midsternum. The artery walls were palpable. The blood pressure was 230/150. The pupils were equal and contracted. The abdominal reflexes were absent. The right biceps was more active than the left. There were no other reflex changes. The fundi were not well seen. They showed no choking of the discs, but abundant evidence of arteriosclerosis and hypertensive retinitis.

Two catheterized specimens of urine showed the specific gravity 1.028 to 1.024, a slight trace to a trace of albumin, 0 to 10 leukocytes at both sediment examinations, 1 to 2 red blood cells at one. Blood examination showed 13,600 leukocytes, 83 per cent polynuclears, hemoglobin 90 per cent, reds 4,400,000, smear normal.

A lumbar puncture gave 10 cubic centimeters of bloody fluid, initial pressure 225, later falling to 180 because of fluid loss and perhaps because of change in the position of the neck. The second 5 cubic centimeters was more bloody than the first. Left jugular compression gave a pressure of 260, right 295. After withdrawal of 10 cubic centimeters the pressure was 95. The fluid showed no clot, 12,500 red blood cells, 75 leukocytes, 70 per cent polynuclears, total protein 178, Wassermann negative, colloidal gold 4555555433.

The temperature was 99.5° to 107.8°, the pulse 63 to 140, the respiration 13 to 38, all steadily rising.

The patient had occasional attacks of increased cyanosis and stertorous breathing; no true convulsions. The night of February 12 the temperature was 104° and the chest showed coarse bubbling râles throughout. The following morning she died.

### CLINICAL DISCUSSION

BY RICHARD C. CABOT, M.D.

#### NOTES ON THE HISTORY

There are many cases of this kind that puzzle us in practice. Did the person become unconscious because he fell downstairs, or did he fall downstairs because he became unconscious? That is often hard to make out and very important to make out. Of course the presence or absence of any paralysis is what guides us mostly. If it is present and early, especially in elderly people who fall, we are apt to lean to the side of calling it a brain lesion rather than a skull fracture, the results of which in the brain seldom show at once.

From her history one must certainly think of brain disease and of kidney disease. As the case starts off we think it is going to be one of uremia in a person with high blood pressure and attacks of unconsciousness. It is not however the full picture of uremia. There is not enough nausea. What other brain trouble could it be? Could it be a series of small vascular lesions, thromboses? Or could it be general paralysis of the insane, dementia paralytica? That is suggested by the mental changes. Until we test the reflexes we cannot exclude general paralysis.

NOTES ON THE PHYSICAL EXAMINATION

The blood pressure was 230/150. Of course in a case of coma one is always in doubt as to whether the brain, because of tumor or hemorrhage, has produced the high blood pressure. But here we know she had high blood pressure before the brain symptoms appeared. I think we should be much safer in guessing that it is going to be a renal case.

I take it the knee jerks were not different.

The examination so far shows no good evidence of nephritis.

The colloidal gold, so far as I know, is not significant. I should not suppose it is characteristic of syphilis.

DIFFERENTIAL DIAGNOSIS

We have to say, I think, high blood pressure, presumably from essential hypertension. If it is explained by kidney trouble we have no evidence of it. Cerebral hemorrhage which we cannot localize may also be present, perhaps in the ventricles, maybe in the frontal lobes, but we cannot say anything more definite than that hypertensive disease was the main cause of death. She ought to have a more or less hypertrophied heart with no valve lesion, and there is some suggestion of a terminal infection, but what I have no idea. So I should say that the whole case is explained by hypertension and its results in cerebral hemorrhage without any good evidence of kidney trouble.

A STUDENT: Might it be a subdural hematoma due to the fall downstairs?

DR. CABOT: Yes. But ordinarily that would give focal symptoms before death.

A STUDENT: Could the symptoms in the lungs explain the blood picture?

DR. CABOT: I do not think we have any characteristic lung symptoms or signs.

Let us go back to the question of the connection between her injury and her head symptoms. That is the same point I raised in the beginning. Did she fall because of some brain lesion, or did she fall accidentally? We are told of no injury except slight bruises. She walked upstairs immediately after it. Of course after trauma some of those hematomas develop considerably later. My guess is however that trauma had nothing to do with it, but I cannot prove it, though the sort of symptoms she had afterwards, the periodic attacks of unconsciousness, are not what I have been led to expect of hematoma.

A STUDENT: What arteries would rupture so that you would get blood in the spinal fluid in hypertensive disease?

DR. CABOT: Any artery that would let blood into the ventricles.

A STUDENT: Wouldn't you expect more hemiplegic symptoms?

DR. CABOT: There are many places in the brain where hemorrhage does not necessarily cause hemiplegia. The ventricle is a good guess here because of its communication with the spinal canal.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Cerebral hemorrhage.

DR. RICHARD C. CABOT'S DIAGNOSES

Essential hypertension.
Cerebral hemorrhage.

ANATOMIC DIAGNOSES

1. *Primary disease.*
(Essential hypertension.)
Cerebral hemorrhage, fresh.

2. *Secondary or terminal lesions.*
Hypertrophy and dilatation of the heart.
Arteriosclerosis.
Old cerebral hemorrhage.
Collapse of the lungs.
Bronchopneumonia, slight.

PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: We found a fresh cerebral hemorrhage. A sagittal section to the left of the mammillary bodies shows an immense cavity filled with fresh clotted blood. Perhaps one-third of that represents the normal ventricular cavity. The rest is hollowed out of the cerebral tissue where the escaping blood has torn apart the normal brain substance. On the opposite side, on the right, we found a smaller area of old softening which I think undoubtedly dates back to the period of the original hemiplegia when the symptoms were definitely on the left. We did not find any trace of the other two milder attacks that she had between the first and the last.

DR. CABOT: Was there any evidence that trauma had anything to do with it?

DR. MALLORY: No.

DR. CABOT: How large was the heart?

DR. MALLORY: The heart was slightly enlarged. The aorta showed a fairly marked degree of sclerosis. The lungs showed a marked degree of collapse and a very slight degree of bronchopneumonia.

DR. CABOT: Would you say the probable sequence of events was hypertension, then cerebral hemorrhage?

DR. MALLORY: Yes.

DR. CABOT: There was not enough in the kidney to explain the hypertension?

DR. MALLORY: There is about the average renal finding for a case of hypertension.

A STUDENT: Would this fit the classification of malignant hypertension?

DR. MALLORY: No, I do not think so. Cases of malignant hypertension ordinarily have a pretty short course. They may live four years from the onset of symptoms, but usually die in less than that time.

Histologically these cases are characterized by an acute type of vascular lesion which was lacking here.

DR. CABOT: She ought to have had more eye signs if she had that.

DR. MALLORY: We did not get a very good look at her eyes. I certainly could not rule it out on clinical grounds. The only way of settling it is by a careful histologic examination, which in this case does not show the acute lesions which are characteristic of the malignant type.

DR. CABOT: There was no evidence of syphilis?

DR. MALLORY: No.

## CASE 17192

## MASSIVE HEMATEMESIS AND ANEMIA IN A WOMAN OF FIFTY-FIVE

### MEDICAL DEPARTMENT

#### PRESENTATION OF CASE

DR. EDWARD G. THORP*: This patient was a fifty-five year old single unoccupied native woman who entered December 2 following a profuse hematemesis. She came into the Emergency Ward comatose. Her history was given by her niece and was grossly inaccurate.

She had been living alone. The niece knew little about the patient's life except that she had had a series of hematemeses six or seven years before entry requiring three transfusions, and had been told that she had a duodenal ulcer, which was proved by x-ray. At that time she had been put on a diet the nature of which was not known. About six weeks before Thanksgiving she had a small hematemesis, the amount not known. She had adhered to the diet very well until Thanksgiving. Then she broke her diet.

On the morning of her entry at eight o'clock she first vomited blood. Two or three hours later she had another hematemesis. Her doctor gave her a sixth of a grain of morphia and sent her to the Emergency Ward. On the way here in the taxi she vomited a pint of blood, clotted, not fresh. On arrival she was comatose, with blood smeared over her mouth and clothing. Her lips and skin were very pale. The pupils were pinpoint. The chest was clear in front. The back was not examined. The heart was enlarged to the left. The rhythm was regular. There was a systolic blow at the apex. The blood pressure on entry was 86/40. The radials were not sclerotic; we could not feel them. The abdomen was negative to gentle palpation. There were absent knee and ankle jerks. The red blood count on entry was just below 2,000,000, with a hemoglobin of 40 per cent. The white cell count was 12,950. The smear showed 86 per cent polynuclears, moderate achromia, marked variation in size and shape.

After entry the blood pressure rose rapidly to 100/40. Morphia in 1/6 grain doses was given. She could take only three doses. Then her respirations would go down to 10 and the morphia was omitted. At two o'clock in the morning the blood pressure fell to 78/30. She was put in shock position and a donor obtained. It was arranged that she should sleep in the Emergency Ward. A transfusion set was prepared so that we could transfuse her at a moment's notice in the ward. The blood pressure after that one low reading of 78/30 immediately rose to 85/40. The pulse had not changed at all. It was 100, occasionally rising to 105. An hour and three-quarters later, at quarter to four, the pulse and blood pressure were unchanged. As soon as I left the ward and went to my room the nurse called me and said the blood pressure was down to 58. The pulse was still 105. I came back to the ward immediately and started to give an intravenous infusion, but before I could give it the patient became pulseless and died.

*Recently senior interne on the East Medical service.

#### CLINICAL DISCUSSION

DR. ARLIE V. BOCK: Why was not cirrhosis considered?

DR. THORP: She had had no history of indigestion at all in the interval. She had been very comfortable.

DR. BOCK: We had a woman much like her a number of years ago who entered the hospital following a brisk hematemesis. She had been admitted a year before for the same reason. At that time a diagnosis of cirrhosis was made. In the intervening year she had not had symptoms. She died from hemorrhage. Her postmortem examination showed an advanced hobnail type of cirrhosis. There was no history of alcohol.

DR. CHESTER M. JONES: One old cirrhotic has been back ten times or more in the past ten years and has had intervals of two or three years between the hematemeses.

Was leiomyosarcoma considered here at all?

A PHYSICIAN: I think she had carcinoma.

DR. FULLER ALBRIGHT: She had some anemia.

DR. THORP: That is the thing that worries us more than anything else.

DR. ALBRIGHT: I think she must have had something else.

DR. THORP: She had a small hematemesis six weeks before entry.

DR. BOCK: Her leukocyte reaction was very slight for the amount of hemorrhage that we should expect if this were bleeding from a duodenal ulcer. We know cirrhotics have a tendency to run a leukopenia, which may have influenced the whole cell response.

DR. TRACY B. MALLORY: Does anyone want to hazard a guess about Banti's disease?

DR. BOCK: She was too old for that.

DR. MALLORY: It certainly would be unusual on that score.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Peptic ulcer, bleeding.

ANATOMIC DIAGNOSES

1. *Primary disease.*

Cirrhosis of the liver.
Esophageal varices.
Ulcer of the esophagus with perforation.

2. *Secondary or terminal lesions.*

Ulcer of the duodenum.
Hyperplasia of the spleen.

## PATHOLOGIC DISCUSSION

DR. MALLORY: I am not perfectly sure what she did have. But she certainly had a sharply punched out ulcer in the duodenum. There was no evidence of bleeding,—no vessels of significant size were present in the base of the ulcer. I do not believe that was the source of her hemorrhage. There were varices in the esophagus and over one of them was a shallow ulceration in the mucosa. Microscopic examination shows immediately under that shallow ulcer a hugely dilated vessel with a great deal of fibrin adherent to the inner surface as though a fresh thrombus were forming in an effort to close a fresh perforation. I am satisfied that her fatal hemorrhage came from the esophagus, not from the duodenal ulcer.

She had a big spleen, 500 grams. It is much firmer than normal, slightly but not strikingly fibrous. We examined carefully the portal and splenic veins, but there were no thrombi.

She had a somewhat small liver, about 1000 grams, which was not nodular but did feel more fibrous than normal. It is not a characteristic picture of cirrhosis of the liver, though it has to be classed as a very mild cirrhosis.

DR. BOCK: Were there no other big veins around the spleen or anywhere else?

DR. MALLORY: No, nothing striking at all.

I remember another autopsy in which there were definite esophageal varices where I could not demonstrate a rupture. In that case too there is a history of gross hematemesis with more than a pint of blood, yet we found an absolutely normal liver and spleen. I do not see why it is not possible theoretically at any rate that varices might occur in the esophagus as well as elsewhere spontaneously without cirrhosis or thrombosis in the portal vein. In varicose veins of the extremities, in the type of varices that cause hematocele, and in many cases of hemorrhoids it is impossible to demonstrate in most instances any satisfactory local etiology. I do not see why it is not quite possible that some people may have larger veins in the esophagus than others and may develop varices without cirrhosis of the liver at all.

DR. BOCK: She did not have diaphragmatic hernia?

DR. MALLORY: No.

DR. JONES: Why do you think the spleen was enlarged?

DR. MALLORY: I cannot answer that. One is tempted to connect her varices with the enlarged spleen and call it Banti's disease, but true Banti's disease should show thrombosis of either the splenic or the portal vein.

DR. JONES: If there were a little closer connection it would be interesting to connect this with the case discussed recently at one of the medical staff meetings in which a splenectomy was done with frank cirrhosis of the liver. The question was raised as to what effect it would have on the ascites and the portal circulation to take out the spleen. In these cases it was apparently of great benefit. You have not got your proof of vascular disturbance here, have you?

DR. MALLORY: No.

There is another group of cases in this connection a little commoner in my experience, cases of frank hematemesis, in which I have been able to find nothing at autopsy except numerous scattered petechial hemorrhages throughout the stomach. I feel sure it is possible to get gross hematemesis merely from them.

DR. JONES: We do in diabetes.

DR. THORP: I should like to ask what her critical level of blood pressure should have been. I thought that maybe if we waited until it was 80 it would be safe. A surgical senior house officer concurred in that opinion.

DR. FREDERICK T. LORD: It is extraordinary, I think, how variable some of the responses to low blood pressures are. We have in general regarded anything under 90 as a critical level. We have had several experiences in the hospital with the persistence of low blood pressures with maintenance of life for a considerable period of time. For example, in a fatal case

Dr. Churchill operated on for pulmonary embolism the blood pressure remained for a number of hours at about 70. Another patient with a bleeding peptic ulcer had a blood pressure in this neighborhood for four or five hours and recovered. With lobar pneumonia, the blood pressure may be low in consequence of toxemia. In a serum-treated Type II pneumococcus infection in a woman of thirty-two in the wards last December the blood pressure remained at 70 systolic and 50 diastolic for most of one night and the following five days varied from 90 to 110 systolic. The patient recovered.

DR. WALTER BAUER: A blood pressure of 60 is not compatible with life if it lasts longer than half an hour, particularly if the drop in blood pressure was sudden.

DR. ALBRIGHT: Don't you think we are considering blood pressures in connection with a normal hemoglobin? There is such a low hemoglobin here that what would ordinarily not be a critically low level of blood pressure might be so in this case.

DR. LORD: A hemoglobin less than 25 per cent is supposed to be incompatible with life.

DR. ALBRIGHT: I mean the combination. Usually we have a fairly high hemoglobin level during the acute stage of hemorrhage.

DR. EDWARD L. YOUNG, JR.: I am occasionally told by an anesthetist, while operating on some difficult or long drawn out case, that the patient's blood pressure has entirely disappeared. This is not necessarily fatal nor has it proved to be necessarily a bad prognosis. It practically always comes back and I am sure I have seen it remain below 70 systolic for several minutes at a time. Unless there is some contraindication, such a patient has the head of the operating table lowered and sometimes is given some stimulation on the table.

DR. LORD: I watched a patient in consultation outside this hospital for about an hour with no blood pressure. She died some time between the time I left her and the time I got home. I could not get it at any time during my period of observation. The extremities, neck and head were cold and clammy, the skin and mucous membranes pale and the pulse rate 150, but she was conscious and clear mentally.

DR. THORP: I had a man in the Emergency Ward with probable hemochromatosis with a blood pressure of 45 over a period of five hours.

DR. MALLORY: An extreme degree of contraction of the peripheral vessels might explain a case like yours, Dr. Lord.

DR. LORD: I thought it was a coronary thrombus. The patient was in a condition of shock. We are dealing in acute hypotension with a number of factors. In patients with pulmonary embolism and coronary thrombosis there is probably peripheral collapse of blood vessels from sudden suspension of the circulation. In patients with hemorrhage, rapid loss of blood produces acute decrease in blood volume. The toxemia of infection may produce vasomotor changes with consequent increase of vascular bed from capillary distention.

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## THE EFFECT OF BLOOD TRANSFUSIONS ON THE DONORS

As the giving of blood for transfusions is an important economic aid to medical students, although perhaps an added strain on the health of students laboring under a heavy medical curriculum, careful investigation of this subject is of marked importance. Unfortunately, but little careful work has been done. The recent report by Jones, Widing and Nelson[1] is not only a valuable contribution in itself but should stimulate further work in this field. They report the detailed study of the effects of 175 transfusions on 50 donors. All but 3 gave blood more than once, and 1 gave 54 transfusions. One donor gave 2000 c.c. within 18 days with a reduction in red count of 740,000, and a reduction in hemoglobin of 15%. However, another case, who gave 1380 c.c. in 3 days, had a drop in hemoglobin from 95% to 60%, and in red count from 5,000,000 to 3,200,000.

Apparently, on the basis of this report, repeated small blood-lettings do far less harm than one or two massive withdrawals. On the basis of their findings, the authors recommend that the amount for donation by males should be 400 c.c., and by females 300 c.c. The donation of 400 c.c. by males causes an average reduction in hemoglobin of 4%, and in red cells of 300,000. The authors state that "if amounts of 400 c.c. or less are given, male donors may be used four or five times at intervals of from 3 to 5 days without ill result".

Even though Jones and his coworkers report subjective improvements in the physical condition of their donors, one cannot but feel that the giving of blood for transfusion purposes at frequent intervals is a potentially dangerous and unjustifiable procedure. There is no scarcity of donors.

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1 Jones, H. W., Widing, H., and Nelson, L.: J. A. M. A., 1931, 96, 1297.

## WILL THE LEGISLATURE LEGALIZE CHIROPRACTIC?

ATTENTION has been called in these columns to the bill before the Legislature designed to admit chiropractors to registration in the Commonwealth of Massachusetts.

The combined Committee on Legislation of the Massachusetts Medical and the Massachusetts Homeopathic Medical Societies has opposed the legislation on the belief that there is no valid reason for bringing into the State a complication which will be a detriment to the welfare of the people. Physicians stand in a coöperative attitude toward public health organizations. Members of a cult restricted to certain forms of practice may not have the diagnostic ability of well-trained doctors and therefore would not be expected to detect some diseases.

The opposition is not inspired by any fear of damage to the medical profession but principally because a type of practice will be encouraged that has no standing in science and may be uncoöperative with public health policies. Even with certain defined restrictions it would be easy to extend the practice beyond the legal limits. Chiropractic already seems to be declining in many sections as shown by fewer chiropractic schools and very great diminution of the number of students in the Palmer School which was its early exponent and had three thousand pupils in 1920. Recent reports give the number of students as less than five hundred. The early literature was more concerned with "selling" chiropractic than with the dissemination of propaganda with respect to its alleged benefits. Later publications and claims indicate some attention to the fundamental sciences on which medicine is founded.

It is significant that some cult designations have persisted in the past until the more progressive members have come to realize the inadequacy or error of the theory and have taken up the serious

study of medicine. Many distinctive titles for example eclectic, thomsonianism, etc., have largely been discarded and even osteopathy will probably follow this trend within a few more years. A clever scheme has been incorporated in the drive for recognition of chiropractic in the bill now before the Legislature in that representatives of the board of registration in medicine are to be associated with the chiropractic examiners. This to some would seem to give medical sanction to the practice or to promise such supervision as would tend to eliminate undesirable applicants.

The imposition of this duty on members of the board is almost an insult for it demands of physicians a quasi endorsement of a theory which has never been accepted by regular medical colleges and has been found unworthy of recognition by many open-minded investigators.

This theory is one among many fanciful claims for filling in the alleged defects of therapeutic medicine and its financial success has depended on salesmanship in appeals to those who have suffered disappointment or who are ready to espouse new theories.

The history of medicine is a narrative of contradictions, its scientific progress, the result of great minds seeking for truth, but its general application hindered by the barnacles of ignorance, superstition and avarice.

The behavior of the legislature in dealing with chiropractic will determine the intellectual development of its members.

## THE JUDGE BAKER FOUNDATION AS A CONSERVATIVE INVESTMENT

THE idea of progress in medicine has such an appeal to the imagination of possible benefactors that emphasis on the new is frequently excessive. In a community where preservation of the substantial and even of the antique is reputable, it seems worth while to speculate a bit upon the market value of an established method of procedure carried on by well seasoned and justly respected veterans.

As such things go, the Judge Baker Foundation is a long-established conservative institution. Its methods are relatively stable and anyone who is familiar with the various publications of its staff knows that the directors are constantly and thoughtfully reviewing past successes and failures while they are seeking to find solutions for present puzzles or planning new attacks for the future.

All doctors know the value of intellectual anchorages. No matter how cheerful and profitable it may be to explore new seas the conservatively efficient people who maintain the shore organization are necessary for the fitting out and the repair of the enthusiasts' fragile fleets of ideas.

The students of human behavior, and still more of human misbehavior, are numerous, eager and of quite variable reliability and competence. The Judge Baker Foundation is in a position to furnish training and information based on real experience. Doctors above all others ought to be prepared to give full support to the campaign for funds for this characteristically and beneficently conservative New England institution.

## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

MORTON, JOHN J. A.B., M.D. Johns Hopkins University Medical School 1913. F.A.C.S. Professor of Surgery, University of Rochester School of Medicine and Dentistry. Surgeon-in-Chief, Strong Memorial and Rochester Municipal Hospitals. Address: Strong Memorial Hospital, Rochester, New York. Associated with him is:

SCOTT, W. J. MERLE. A.B., A.M., M.D. Johns Hopkins University Medical School 1918. F.A.C.S. Associate Professor of Surgery, University of Rochester School of Medicine and Dentistry. Associate Surgeon, Strong Memorial and Rochester Municipal Hospitals. Address: Strong Memorial Hospital, Rochester, New York. Their subject is: "Methods For Estimating the Degree of Sympathetic Vasoconstriction in Peripheral Vascular Diseases." Page 955.

TUTTLE, GEORGE HERMAN. A.B., M.D. Harvard University Medical School 1891. Assistant Surgeon, U. S. A. Spanish War. Assistant in Medicine, Massachusetts General Hospital. His subject is: "Is Diabetes Caused by Paralysis of the Pancreatic Filaments of the Right Vagus Nerve?" Page 963. Address: South Acton, Mass.

COLMES, ABRAHAM. M.D. Boston University 1915. Assistant Visiting Physician, Beth Israel Hospital. Assistant in Medicine, Massachusetts General Hospital. Teaching Assistant in Theory and Practice, Tufts College Medical School. His subject is: "Studies in Asthma." Page 965. Address: 471 Commonwealth Avenue, Boston.

WEECH, ALEXANDER ASHLEY. M.D. Johns Hopkins University Medical School 1921. Associate Professor of Pediatrics, Peiping Union Medical College, China. His subject is: "Scarlet Fever in China." Page 968. Address: Babies' Hospital, New York, New York.

SOWLES, HORACE K. A.B., M.D. Harvard University Medical School 1915. F.A.C.S. Surgeon to Outpatients, Massachusetts General Hospital. Assistant Visiting Surgeon, Beth Israel

Hospital. Surgeon, Lawrence Memorial Hospital. Associate Surgeon, Faulkner Hospital. Instructor in Surgery, Tufts College Medical School. His subject is: "Treatment of Simple Fractures on the Fracture Service at the Massachusetts General Hospital." Page 975. Address: 279 Clarendon Street, Boston.

LEARY, TIMOTHY. M.D. Harvard University Medical School 1895. Professor of Pathology and Bacteriology and Medical Jurisprudence, Tufts College Medical School. Address: 818 Harrison Avenue, Boston. Associated with him is:

HODGSON, JOHN S. Ph.B., M.D. Harvard University Medical School 1915. F.A.C.S. Assistant Visiting Surgeon, Massachusetts General Hospital. Address: 144 Commonwealth Avenue, Boston. And

MYERSON, ABRAHAM. M.D. Tufts College Medical School 1908. Director of Research, Boston State Hospital. Psychiatric Examiner of Prisoners, Commonwealth of Massachusetts. Professor of Neurology, Tufts College Medical School. Senior Neurologist, Boston City Hospital and Beth Israel Hospital. Address: 270 Commonwealth Avenue, Boston. Their subject is: "Intracranial Pathology, Lesions, Diagnosis and Treatment." Page 984.

MOORE, HARRY H. A.B., A.M., Ph.D. Public Health Economist, Division of Scientific Research, U. S. Public Health Science. Director of Study, Committee on the Costs of Medical Care. His subject is: "Progress During 1930 in Medicine and Public Health." Page 994. Address: 910 Seventeenth Street, Washington, D. C.

## MASSACHUSETTS LEGISLATIVE NOTE

House bill 1538—to Register Chiropractors.

Hearing will be held Monday, May 11, Room 245, State House.

## MISCELLANY

### A NEW UNIT OF THE BOSTON CITY HOSPITAL

An important addition to the Boston City Hospital consisting of a neurological unit has been created to be operated under the supervision of Dr. Stanley Cobb.

This department will occupy three floors of the new building on Harrison Avenue and has been made possible by the combined gifts of the educational board of the Rockefeller Foundation and Harvard University.

Associated with Dr. Cobb will be a group of neurologists and surgeons. Dr. Donald Munro with the assistance of Dr. Tracy J. Putnam will be in charge of the surgical department.

This new department of the City Hospital will be a prominent addition to the scientific institutions of Boston.

### PERSONAL HEALTH CERTIFICATES IN KENTUCKY

In addition to specific standards for ice cream and the constituents thereof Kentucky requires that "every person connected with an ice cream plant which brings him in contact with the handling, storing or transportation of milk products or ice cream, shall have within 12 months passed a medical examination by the State Board of Health."

### A BROADCASTING MESSAGE BY THE STATE DEPARTMENT OF PUBLIC HEALTH

#### HEART DISEASE*

RICHARD C. CABOT, M.D.†

Heart disease is now the most important of all the causes of sickness and of death in the United States. There are three main kinds that one needs to know about: (1) rheumatic heart disease, (2) the sort of heart disease that goes with high blood pressure, and (3) the kind that comes in elderly people with pain about the heart.

As to each of these there are three useful things to know; the first is this: Many people are thought to have heart disease, and think themselves they have it, when in fact they do not. It is very desirable, therefore, before you embark on a long, possibly expensive, and certainly troublesome course of treatment, to make sure that the diagnosis of your physician has been right. There are many mistakes in this matter. One specialist whom I know saw eighteen persons in succession who believed that they had heart trouble, and of those eighteen the specialist found that sixteen did not have it. Therefore, if you or any of your friends are considered to have heart disease, it is quite possible that there is a mistake about it. It is worth while to make certain.

The second point about heart disease is that if you have it, it cannot be cured. It is there for good. But this is the third point: You can learn to live with it and to accomplish most that you need to do, in spite of it.

Rheumatic heart disease, the first of the types that I have spoken of, does not go with the rheumatism that we usually think of, in old persons with stiff, painful joints. It is the rheumatism of children, ordinarily starting before twenty-one, and associated often with trouble in the tonsils, with an obscure trouble in the brain which gives what we call St. Vitus dance or chorea,—an irregular sort of jerking of the hands and feet which is often mistaken for carelessness or nervousness or naughtiness by parents and school teachers. This same germ, the germ of rheumatism in children which makes their joints sore and painful and produces fever, is very apt to attack the heart. Probably, in two-thirds of the

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cases in which children have rheumatism, the heart is attacked by the same germ.

The essential thing is, that if the heart is attacked, the child should have a long rest in bed, weeks, sometimes months, so that the heart will have time to compensate, as we say, for the disease, which will always be there, but which the heart, like the heart's possessor, can learn to get along with.

The second type of heart disease, which is more common—probably two or three times as common as all other kinds put together—is the sort that comes in elderly people with high blood pressure. It comes on very gradually, often produces no symptoms, and generally needs no treatment for a number of years. But sooner or later these people, like all who suffer from heart disease, begin to be short of breath, cannot go uphill or climb stairs without puffing much more than they would in health. And later, if they persist in trying to go upstairs or to climb hills and to carry on muscular work, they are likely to find that they have swelling of the feet, which is a more serious symptom in heart disease, though it is common and harmless in stout people without heart disease.

The third type of heart disease, fortunately less common than the others, is the type associated with pain about the heart in elderly people. Ordinarily it is called *angina pectoris* or breast pain. There is only one good thing to say about this disease: it is more common in the rich than it is in the poor, and because the rich are so much fewer than the poor, I am glad that the disease does not attack the other portion of the human race more frequently. This is recognizable because it brings on pain about the heart, and sometimes down the left arm, produced only when the person exerts himself and stopping when he rests. The position of the pain is not so important as the fact that it is produced by exertion or by emotion, as might happen by getting into a temper, and that it stops with rest.

In all these types of heart disease one needs a doctor very much in the beginning, to start one off, to make a diagnosis, to make a plan of treatment, and to teach one how to live. But in this as in most other diseases it is a mistake to get "the doctor habit" or to go on doctoring indefinitely. The well-trained doctor can teach any one with heart disease how to take care of himself better than the doctor or any other human being can, for the patient is on the job twenty-four hours out of the twenty-four, and is more interested than any one else can be.

Teaching people how to live with heart disease, whatever its type, is teaching them to avoid whatever taxes them beyond their limits. The person with heart disease can get along perfectly well so long as he stays within his limit of physical exertion. For instance, he ought to live on the ground floor in case he does not live where he can get an elevator. He ought not to waste his strength going upstairs. If he can avoid it, he ought not to live on a hilltop, where he has to climb the hill every time he comes home. He ought to get out of the habit of hurrying to catch a train or a car. Better lose the train than lose his health, and a person with heart disease has still his share of health, if only he will be thrifty with it. He must learn not to try to walk much in icy, snowy weather such as we are having now, when people can use themselves up very easily and not know how much it is costing. A person with heart disease has to learn to start slowly, and not to make exertions soon after meals, especially soon after breakfast, because then the combination of exertion in the morning and exertion after meals makes a dangerous load for him. He has to learn to get his full allowance of sleep, because the whole body as well as the heart rests at night and rebuilds the tissue which has been torn down during the day. Sleep is important in every disease as well as in health, and especially important in heart disease. He has to learn not to overeat. He has to give up the drinking of alcohol. He does not have to give up smoking. He is often told that he has, but smoking almost never does any harm to genuine organic heart trouble. He has to learn that he must not get fat, must not increase his weight, because that increases the burden that the heart must carry. He has to learn how to take the one drug that is of value in certain stages of heart disease, and that is digitalis. The dose has to vary from day to day and from week to week. He has to find out how much he needs under the careful directions of his doctor. Then he can carry on for himself.

## SOUND MOTION PICTURES IN VARIOUS INSTITUTIONS

Sound motion pictures as a medium to provide entertainment and relaxation for inmates and patients of hospitals and other institutions in which the mentally ill, the physically incapacitated and the social offender are confined, are attracting the attention of leaders in the study of criminology and mental deficiency throughout the country. During the past year many penal institutions and hospitals have installed sound motion equipment, and, according to the heads of those institutions, the entertainment provided for the imprisoned and confined has been exceedingly beneficial.

The states of Ohio and Washington have so far taken the lead in the conversion to sound from the silent picture, with growing interest in evidence from other Commonwealths. In Ohio the sound motion picture reproducing equipment installed several months ago in the State Penitentiary, the State Hospital at Toledo and the State Hospital at Dayton, has been pronounced as being exceptionally successful.

## DR. WILLIAM NORTON BULLARD'S GIFTS TO THE BOSTON MEDICAL LIBRARY

Dr. Bullard for a great many years had been buying early printed medical books. At first, he was interested in 16th and 17th century classical texts but he gradually began to buy incunabula and Spanish imprints, and finally, four years ago he decided to limit his buying entirely to the field of incunab-

ula. In the latter part of 1926, through the generosity of Dr. Bullard, two sections of the bookcase on the north side of Holmes Hall were converted into locked cases, and in the spring of 1927, Dr. Bullard loaned the Boston Medical Library his collection of medical incunabula, which at that time numbered one hundred volumes. During the succeeding years, Dr. Bullard was very active in adding to his collection until at the time of his death, the collection numbered 217 titles, among which are many outstanding classics of the middle ages. In addition to this number may be noted a total of fifteen incunabula which Dr. Bullard had purchased and given to the Library at various times and which were shelved with his collection. In July, 1929, there was printed at the Merrymount Press of Boston a catalogue compiled by James F. Ballard of the books then contained in the William Norton Bullard Loan Collection, which was presented to Dr. Bullard on his birthday by Mrs. Bullard.

Dr. Bullard was not interested in first editions or in more than one edition of any book, but he had planned to bring together one edition of all the medical books printed in the 15th century, as well as books on collateral subjects. He was much interested in dictionaries and vocabularies, as he believed that such books were essential in the collection which he was gathering for permanent use of scholars. During the past years, Dr. Bullard and Mr. Ballard of the Boston Medical Library worked together in assembling a Library such as might have been gathered for reference by large independent medical institutions in the 15th century. In 1928, Dr. Bullard gave to the Library his very fine collection of 16th and 17th century medical books numbering about five hundred volumes. This particular collection contains many important classical texts, as well as quite a number of rare books on witchcraft, a number of Spanish imprints, including a complete set of Lobera, d'Avila and such outstanding items as the first edition of Holbein's "Dance of Death," Josselyn's "New England Rarities," Bullein's "Bulwarke of Defence," etc.

In his will, Dr. Bullard has given to the Library his collection of medical incunabula, as well as all other medical books which he owned and has made provision to carry on the building up of both of his collections by leaving a bequest of $50,000.00 to be used for the purchase of books and manuscripts printed prior to 1700. The last book which Dr. Bullard added to his collection was a complete perfect copy of the important "Buch der Natur" printed at Strassburg in 1499.

There are so many important books in the collection that it is impossible to mention them all, but of outstanding interest are: the "Opus Universo" of Rabanus Maurus, printed at Strassburg before July 20, 1467, being No. 1 in the Osler "Incunabula Medica"; the 1491 edition of John of Ketham's "Fasiculus Medicine," which is the first medical book to be illustrated with wood-cuts and the only copy in the United States; the first edition, 1489, of the anonymous "Versehung Lieb, Seele, Ehre Und Gut"; and the "Golden Harps" of Nider, printed by Baemler at Augsburg, 1472, a monument of the printer's art. The Bullard copy is the Huth one, in which all the initials are superbly illuminated in gold and colors. It is truly a museum piece, worthy of the Library of a king. The collection is very rich in encyclopedias of general knowledge, dictionaries and vocabularies, medical encyclopedias, texts of the classical authors, philosophers and scholastics and the Arabian authors. There is a fine representation of the authors of the 12th, 13th, 14th and, especially of the 15th century. Special fields of medicine, such as pediatrics, gynecology, dietetics and surgery, etc., are represented and there is a goodly number of tracts on the plague and syphilis, as well as tracts on popular medicine in the vernacular. There is a good collection of books of astrology, magic, witchcraft, demonology, chiromancy, memory, herbals, etc.

The total number of incunabula now in the Boston Medical Library is 279, and it is the third largest collection in the United States and Canada. It is pleasing to know that Dr. Bullard has made provision for its continued growth.

## TUBERCULOSIS ABSTRACTS

BULLETIN OF THE NATIONAL TUBERCULOSIS ASSOCIATION

The greater precision of the x-ray film, its permanence, and the convenience of studying it at leisure are advantages over the fluoroscopic method. But the fluoroscope is of great value under certain special conditions. Its advantages are chiefly economy of time and money for the examination of large groups of apparently well adults. Some clinicians maintain that with the fluoroscope it is possible to discover the lesions as accurately as, and more quickly than, by means of percussion and auscultation. None will deny that a physical and x-ray examination is the most accurate. But a physical and fluoroscopic examination is better than a physical alone. Certainly the fluoroscopic method deserves study by those who are interested in finding tuberculosis in groups of college students, employees and soldiers.

THE FLUOROSCOPE IN THE DIAGNOSIS OF TUBERCULOSIS

Reid in 1929 reported on the results of examining applicants for positions in a large insurance company with the fluoroscope. This examination was used at first as an adjunct to the routine physical examination of the chest. The accuracy of the method was tested on 100 persons whose chests were negative on physical examination and were passed fluoroscopically as normal. These were x-rayed and the entire group was classified as with "healthy adult chests" by the roentgenologist. Another group of 123 cases in which definite signs were described by the same physician, such as harsh breath sounds, transient râles, and prolonged expiration at the apices, were fluoroscoped, classified, and then x-rayed. In only one of these did the x-ray show evidences of tuberculosis and this at a very early stage. Reid concluded that "in the absence of physical signs, it is possible to demonstrate pulmonary pathological changes by means of the fluoroscope with sufficient accuracy to render the procedure a most valuable adjunct to the routine phys-

ical examination of young adults".—*The Value of the Fluoroscope as an Adjunct to Routine Physical Examination of the Chest, Ada Chree Reid, Amer. Rev. of Tuberc., July, 1929.*

FLUOROSCOPIC EXAMINATIONS OF UNIVERSITY STUDENTS

Kattentidt reports the findings among students of the University of Munich. In the winter of 1929-30, he made fluoroscopic examinations of 1,768 students (1,363 males and 405 females) as part of the compulsory physical examinations at matriculation. Some evidence of tuberculosis was found in 14.5 per cent. In most cases, the tuberculous lesion was inactive, a few were partially active, but in six cases, or 0.34 per cent. of the entire series, there was an open lesion. These six cases all occurred in males. At the same time, 772 students (699 males and 73 females) were examined at their own request. The findings were substantially the same as among the "compulsory" group. In the previous summer semester (1929), the percentage of tuberculous lesions found in 1,437 male students was 22.6 per cent. and 0.49 per cent. open lesions, and of 360 female students 15 per cent. tuberculous lesions and 0.28 per cent. open lesions.

Combining the findings for the two semesters of compulsory and voluntary examinations of 4,836 students of both sexes, the results were as follows:

| | |
|---|---|
| Inactive lesions | 14.8 % |
| Partially active lesions | 1.3 % |
| Active closed lesions | 0.17% |
| Open lesions | 0.39% |
| Total tuberculous lesions found | 16.66% |

The author cites the findings of Kayser-Petersen and Wiewiorowski, who examined male university students. Adding this series to his own, he finds that in the combined groups of 6,513 apparently healthy young men between 20 and 30 years of age, 30 cases or 0.46 per cent. had open tuberculosis. This figure, he believes, represents the incidence of tuberculosis among this group at a certain definite time.

DEVELOPMENT OF ACTIVITY DURING SEMESTER

Further cases of active tuberculosis may develop in the group, as shown in repeated examinations. Thus, of 2,296 students examined in the summer semester of 1929, four more students (male) developed open tuberculosis and one an active closed tuberculosis up to June 25, 1930. Of the students examined in the winter semester of 1929-30, one additional case of active closed tuberculosis developed. Thus, in the course of a year, the incidence of open tuberculosis increased from 0.48 per cent. to 0.65 per cent.

Brief clinical histories are given in the eleven cases (eight with open and three with closed lesions) discovered in the winter semester. The lesion was usually of the chronic interstitial type; the sputum was positive for tubercle bacilli in seven cases, negative in three cases and no sputum was obtainable in one case. Physical examination showed no evidence of tuberculosis in seven of these eleven cases. This would indicate that physical examination alone fails to reveal tuberculosis in a larger percentage of cases than has been suspected. In these eleven cases, eight had open lesions as shown by the positive bacteriological findings in seven cases and the clinical findings in one case. Yet none of these showed large areas of destruction; the author has often been surprised to find tubercle bacilli in the sputum in cases in which there was little evidence of a destructive process.

SUPERVISION OF CASES NECESSARY

Continuous supervision of such cases is necessary, however, as shown by the case of one student, who showed hilus changes on her first examination, and no definite changes on reëxamination half a year later (no lesions in the pulmonary tissue). Yet ten days after this second examination, this student had a pulmonary hemorrhage, which was thought to be due to bronchiectasis, as the sputum was negative and the red cell sedimentation velocity was normal. As a matter of precaution, she was sent to a sanatorium for observation and there pulmonary focal lesions developed suddenly with positive sputum; the tubercle bacilli persisted in the sputum for several months. This was the only case in which signs of activity developed in cases with inactive lesions within six months. But this is not remarkable, since tuberculosis is a decidedly chronic disease; it indicates that these cases must be kept under prolonged supervision.

Among 44 cases diagnosed as partially active in the summer semester (1929) two students developed symptoms that necessitated sanatorium treatment. In one of these cases, there was an increase in the pulmonary lesion, and the sputum showed a few tubercle bacilli. In the second case, the pulmonary lesions showed little change, but new adhesions had developed, and the patient's general condition was poor.

TYPES OF LESIONS

A study of the types of tuberculous lesions found at the different ages in the 2,540 students examined in the winter semester showed 457 students under twenty years of age (17 to 19), the great majority over twenty years of age (from 20 to 30 years). The early forms of tuberculous lesions, including exudative pleurisy, occurred only at the earlier ages, mostly at twenty years or younger. Most of the cases of open tuberculosis occurred at twenty-one years of age or later, only two cases at the age of twenty, and none before the age of twenty. The highest percentage of cases of open tuberculosis occurred at the age of twenty-one (in 0.78 per cent. of students at this age). The focus of infection was demonstrable only in six of the nineteen active cases of tuberculosis.

HEALTH CARE OF STUDENTS

The records of the results of the physical examination and of the fluoroscopic examination are filed with the university. The student is also given a printed card showing the result of the fluoroscopic examination, and whether there is any indication of tuberculous lesion in the lung, whether such lesions are

entirely inactive or show any signs of activity, and whether any type of athletics is permissible. This brings the patient into contact with the athletic medical director, where this is advisable, and indicates whether further supervision or examination is desirable, or whether immediate treatment is necessary. The author is of the opinion that certain types of sports and gymnastic exercise are of definite value in the treatment of inactive tuberculosis; and that the close coöperation established with the athletic medical director by the system adopted is of definite value for the students, and for the further study of the effect of athletics on respiration and circulation in relation to the effects on tuberculosis.—*Fluoroscopic Examination in the Second Semester at the University of Munich, B. Kattentidt, Ztschi. f. Tuber., 58:209, 1930 (October).*

## DR. GEORGE H. BIGELOW EXPLAINS HIS ATTITUDE TOWARD CERTAIN MEDICAL AND ECONOMIC PROBLEMS

In the Boston Post of April 27 the report of an interview with Dr. George H. Bigelow, the Massachusetts Commissioner of Public Health, appeared. This caused resentment in a group of physicians and when the matter was called to Dr. Bigelow's attention a letter was sent to the Boston Post, a copy of which is appended.

COPY OF A LETTER TO THE EDITOR OF THE BOSTON POST

May 4, 1931.

To the Editor,
*Boston Post,*
Boston, Massachusetts.

*Dear Sir:*

A recent article in your paper, based on an interview, gave the impression that I felt that the principal medical problem today was the curbing of "gouging" doctors. Such a statement is, of course, absurd and has naturally aroused resentment.

I was interviewed in regard to some recent statements by Dr. Haven Emerson in New York in regard to certain aspects of medical economics. I gave about two hours to your reporter in order that I might make myself clear and at the end expressed the hope that he would "treat me kindly". He stated that he would feature the importance to every family of selecting a general practitioner in whom they had confidence. This would avoid many of the dangers and misunderstandings and extravagances that come from medical "shopping" among the unrelated specialties. The general practitioner can select the appropriate specialist, when needed, and can interpret the findings to the family.

Further I stated that I felt that extension of medical centers or clinics with specialized equipment and professional skill available at moderate cost would go far in solving the present economic dilemma. Here patients can be carefully studied and returned with appropriate advice to their private physicians. These should probably preferably not be conducted by the government.

Also I emphasized that to the man in the street the cost of medical care means doctors' fees, while in reality doctors get only about 25 cents on every dollar spent by the American people for sickness. Cut their income in halves and you would save only 12 per cent. But any such plan would be suicidal. We need more competent physicians. Yet if we undermine the economics of a profession it ceases to attract competent new material. Should this happen the future of our people as regards medical care would be grave indeed.

Yet you featured as the crux of the interview "gouging" doctors. To say there were no dishonest or commercial physicians would be as absurd as to say there were not similar individuals among reporters, lawyers and other large groups of human beings. Yet to blame my present dilemma on reporters would be as illogical as to suggest curing the medical, social, economic impasse by curbing "gouging" doctors. In my case the trouble I fancy was with the headline writer, a pathological idea of "news" today, and an insatiable verbosity on my part.

Yours truly,
GEORGE H. BIGELOW, M.D.,
*Commissioner of Public Health.*

The lesson to be learned from this is to require a copy of the report of an interview before its publication whenever possible.

## A DINNER TO DR. CLARENCE L. SCAMMAN

Forty friends and co-workers of Dr. Clarence L. Scamman, Deputy Commissioner of Public Health of Massachusetts, attended a farewell dinner to him at the Harvard Club of Boston on Friday evening, May 1.

Dr. Scamman is leaving Massachusetts on May 15 to become Director of the Division of Public Health of the Commonwealth Fund of New York.

Dr. George H. Bigelow, Commissioner of Public Health, presided.

Addresses of appreciation for his five years of public service in Massachusetts were made by Dr. Herbert L. Lombard, Director of the Division of Adult Hygiene; Dr. George M. Sullivan, Superintendent of Pondville Hospital; Professor Gordon Fair of Harvard School of Engineering; Dr. Gaylord Anderson of the Department of Public Health, who succeeds Dr. Scamman; and Frank Kiernan of the Massachusetts Tuberculosis League. Perhaps the most notable feature was the presentation of a letter from Dr. Charles V. Chapin, Superintendent of Health of Providence, with whom Dr. Scamman worked for four years. Few in the field of public health have received such a tribute from such an authority.

A traveling bag, a token of the good will of his friends and co-workers, was presented to Dr. Scamman.

In a speech of appreciation, Dr. Scamman acknowledged his debt to the members of his immediate staff in the Division of Communicable Diseases and to

the members of the staff of the State Department of Public Health and the private organizations with which he has been connected during the past five years.

## CORRESPONDENCE

### ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street, Chicago, Ill.
April 25, 1931.

Managing Editor, *New England Journal of Medicine:*
165 Newbury St., Boston, Mass.

*Dear Doctor:*

In addition to the articles enumerated in our letter of March 28 the following has been accepted:

Ciba Company, Inc.

Ampules Solution of Nupercaine-Ciba, 25 cc., 1:1000.

Yours truly,
W. A. PUCKNER, *Secretary,*
*Council on Pharmacy and Chemistry.*

## RECENT DEATH

**BUTTERFIELD**—DR. GEORGE W. BUTTERFIELD died in Hopkinton, Massachusetts, April 28, 1931, age 71.

He received the degree of M.D. from the Boston University School of Medicine in 1883 and began practice in Ashland in 1885, moved to Wakefield in 1897, and in 1910 located in Hopkinton.

Surviving him are two daughters, Marion S., Mrs. Ruth Balch; a brother, Roscoe S. Butterfield, and a sister, Mrs. Marion Knight of Ohio.

## NEWS ITEM

**OFFICERS ELECTED AT THE THIRTY-FOURTH ANNUAL MEETING OF THE AMERICAN GASTRO-ENTEROLOGICAL ASSOCIATION**—This meeting was held in Atlantic City May 5, 1931. The following named officers were elected: President, Dr. Clement R. Jones, Pittsburgh, Pa.; first vice-president, Dr. Burrill B. Crohn, New York City; second vice president, Dr. John Bryant of Boston; secretary, Dr. Charles G. Lucas, Louisville, Kentucky; treasurer, Dr. Thomas Wray Grayson, Pittsburgh, Pa., and recorder, Dr. Sara M. Jordan of Boston.

## REPORTS AND NOTICES OF MEETINGS

### HARVARD MEDICAL SOCIETY

Eighteen years ago the Peter Bent Brigham Hospital established the annual custom of inviting some clinician, prominent in the field of medicine, to act as Physician-in-Chief, pro tempore, for one week. This year Dr. Lewellys F. Barker, Baltimore, Maryland, accepted the invitation. On Tuesday evening, April 21, 1931 a special meeting of the Harvard Medical Society was held and Dr. Barker gave a clinical discussion of the cases presented. Dr. Henry A. Christian presided.

The first case, a 62-year-old tailor, entered the hospital complaining of pain in the epigastrium of seven weeks' duration. The present illness started five years ago with the gradual onset of weakness in the hands. Two years ago the legs became involved and the patient was confined to the house. Seven weeks ago a dull, gnawing, constant pain in the epigastrium began, having no relation to food and unrelieved by vomiting. Physical examination showed fibrillary twitching of the tongue with definite atrophy on the right side. There was atrophy of the thenar and hypothenar eminences. The biceps reflexes were absent and the triceps reflexes were accentuated. The knee jerks and ankle jerks were present. There was a questionable Babinski. There were no sensory disturbances. The laboratory reports were essentially negative.

The second case was a 42-year-old engineer who entered complaining of speech difficulty and of weakness in the right hand. One year ago there appeared a gradual weakness in the right hand followed one month later by involvement of the left hand. The patient noticed, too, a slight slurring of his speech and a quavering of his voice during excitement. Six months ago his legs became weaker. For the past two months he has had dysphagia with regurgitation of food through his nose. He was unable to extend his fingers completely. Physical examination showed an increased left nasolabial fold and fibrillary twitching of the tongue. There was wasting of the thenar and hypothenar eminences, the upper arm and the shoulder girdle. The back showed marked fibrillary twitching. Babinski's sign was positive. There was marked dysarthria.

In discussing the neurological aspects of these cases Dr. Barker said that the majority of cases of muscular wasting can be grouped under one of two types. The first type is primary muscular wasting and the second is muscular wasting secondary to disease of the central nervous system. In differentiating the two he listed the following principles:

| | Primary muscular wasting | Muscular wasting secondary to disease of central nervous system |
|---|---|---|
| Age of onset | Childhood or adolescence | Mid life or later |
| Distribution of wasting | Trunk or proximal extremities | Small muscles of hands and legs |
| Fibrillary twitching | Usually absent | Present |
| Familial incidence | Usually present | Absent |
| Spastic phenomena | Absent | Sometimes present |

This classification does not include the type known as Charcot-Marie Tooth or progressive neural atrophy and muscular atrophy secondary to acute infectious processes. The two cases were presented as

belonging to the group of muscular wasting secondary to disease of the central nervous system.

Using a case of encephalitis, in a boy of 18, as an example Dr. Barker illustrated how in attempting to arrive at a diagnosis we should first have all the signs and symptoms in mind; second, determine what portion of the nervous system they indicate; and third, decide what pathological lesion will account for the condition.

The rationale of giving insulin and glucose to underweight individuals is based on the theory that certain cases of obesity are due to an overactivity of the pancreas. For the past three years Dr. Barker has been using this method in nervous and debilitated individuals with excellent results.

Doses of ten units given before each meal have produced a remarkable change in appetite and a steady, rapid gain in weight. These individuals retain this weight and often the appetite remains greatly improved. Regarding its use in chronic infections, especially tuberculosis, there is some divergence of opinion. Dr. Barker is of the opinion that its cautious use in tuberculosis is safe. Best results have been obtained by daily doses of not more than thirty units over a period not exceeding three weeks, alternating with a period of like duration in which no insulin is given. Proper precautions should be taken to guard against hypoglycaemia reactions.

## PLYMOUTH DISTRICT MEDICAL SOCIETY

The next meeting of the Plymouth District Medical Society will be held at Grand Army Hall, Abington, Thursday, May 21, at 11 A. M.

Speaker: Dr. George R. Minot, Professor of Clinical Medicine, Harvard, and Director Thorndike Memorial Laboratories, Boston City Hospital.

Subject: "The Adequate Treatment of Anemia", with lantern slide illustration.

Clinical Cases by Members.

July 17, Midsummer Meeting at Plymouth.

Program: 11 A. M. Clinic at Jordan Hospital. Dr. Francis D. Donoghue of Boston and members of the staff.

1 P. M. Dinner at Mayflower Inn.

Speaker to be announced.

Orchestra, dancing in ballroom.

Golf; bathing.

All members of the Massachusetts Medical Society are cordially invited with guests.

JOHN J. MCNAMARA, *President.*

## NEISSERIAN MEDICAL SOCIETY OF MASSACHUSETTS

The entire medical profession is cordially invited to attend the next meeting of the Neisserian Medical Society of Massachusetts, to be held on May 12, 1931. The program of the meeting is as follows:

MORNING—10:00 A. M.—Clinics (with Laboratory Demonstrations)

*Gonorrhea in the Female*

Boston Dispensary, 25 Bennet Street
Alonzo K. Paine, M.D., and Associates

Boston City Hospital, Out-Patient Department, 818 Harrison Avenue
Frederick L. Good, M.D., and Associates

*Gonorrhea in the Male*

Massachusetts General Hospital, Out-Patient Department, Fruit Street
J. Dellinger Barney, M.D., and Associates

Boston City Hospital, Out-Patient Department, 818 Harrison Avenue
Augustus Riley, M.D., and Associates.

AFTERNOON—2:30 P.M.—University Club, 40 Trinity Place

*Sociological and Public Health*

Achieving the Impossible
George H. Bigelow, M.D., Massachusetts Commissioner of Public Health

Forum—The Management of Gonorrhea
Discussion led by Drs. Paine, Good, Barney and Riley

The Patient as a Starting Point in the Search for Gonorrhea
Alice I. Gorman, R.N., Social Worker, Lowell V. D. Clinic
Elizabeth P. Rice, Chief of Social Service, Boston Dispensary
Ida M. Cannon, Chief of Social Service, Massachusetts General Hospital

The Health Officer Knocks at the Patient's Door
Frederick Walmsley, Inspector, Malden Board of Health
Frederick J. Bailey, M.D., Deputy Commissioner, Boston Health Department

The Physician as the Ultimate Health Officer
N. A. Nelson, M.D., Massachusetts Department of Public Health

## NEW ENGLAND PEDIATRIC SOCIETY

New Haven Hospital, New Haven, Conn., May 16, 1931.

Program:

1:30 P. M. (D. S. T.)—Medical and Pediatric Laboratory. Clinical papers and demonstrations.

6 P. M.—Dinner, Faculty Club.

GERALD HOEFFEL, *Secretary.*

## NEW ENGLAND ROENTGEN RAY SOCIETY

The Annual Meeting will be held at the Boston Art Club, Boston, Mass., Friday night, May 15, 1931.

A dinner will be served at the Boston Art Club at 6:45.

SCIENTIFIC PROGRAM

Symposium by the Staff of the New England Peabody Home for Crippled Children.

"Some Aspects of Tuberculosis of the Spine." Dr. Edwin C. Cave.

"Extra-articular Tuberculosis." Dr. Joseph S. Barr.

"Tuberculous Dactylitis." Dr. A. H. Brewster.

"The Effect of Heliotherapy on the Peripheral Circulating Blood in Cases of Bone and Joint Tuberculosis." Dr. Gerald N. Hoeffel.

T. R. HEALY, M.D., *Secretary.*

370 Marlborough Street, Boston, Mass.

## CLINICAL STAFF OF THE BOSTON DISPENSARY

The May meeting of the Clinical Staff of the Boston Dispensary will be held Thursday evening, May 21, 1931, at 8:15 P. M., at 25 Bennet Street, under the auspices of the Division of Research.

PROGRAM

1. "Paroxysmal Hemoglobinuria" — Francis M. Thurmon, M.D.

2. "Marriage of Infectious Syphilitics"—William A. Hinton, M.D.

Discussion: (Discussers to be announced later).

Physicians, Medical Students, Nurses and Social Workers are cordially invited to attend.

JOSEPH H. PRATT, M.D., *President.*
ROBERT W. BUCK, M.D., *Secretary.*

## SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held on Tuesday, May 19, 1931, at 12 noon, at the office of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston.

The speaker will be Donald Macomber, M.D., and his subject, "The Treatment of Sterility from a Practical Standpoint."

Luncheon will be served at 1 o'clock. All physicians are cordially invited to attend this meeting.

## GREATER BOSTON BICKUR CHOLIM HOSPITAL STAFF MEETING

On Monday, April 27, 1931, there was a regular monthly meeting of the staff of the Greater Boston Bickur Cholim Hospital.

After a short business meeting, when arrangements were completed for the coming second annual banquet meeting of the staff, Dr. J. H. Schwartz of the Beth Israel and Massachusetts General Hospitals delivered a talk on Psoriasis. In his talk Dr. Schwartz touched especially upon the latest etiological factors of this disease. He himself is inclined to accept a toxic, allergic factor, due to a mycotic infection in the large bowel. In a few cases the same organism could be isolated from the stool as well as from the blood of the affected individual.

A lively discussion followed.

## SOCIETY MEETINGS
## CONGRESSES AND CONFERENCES

**May 11-14—Meeting of the National Tuberculosis Association at Syracuse. See page 1310, issue of December 25.**

**May 12**—Nelsserian Medical Society of Massachusetts. See page 1011.

**May 13**—Cardiac Course. See page 951, issue of April 30.

**May 15**—New England Roentgen Ray Society. See page 1011.

**May 16**—New England Pediatric Society. See page 1011.

**May 19**—South End Medical Club. See notice elsewhere on this page.

**May 21**—Clinical Staff of the Boston Dispensary. See notice elsewhere on this page.

**June 7, 8, and 9**—The American Proctologic Society. See page 951, issue of April 30.

**June 8-12**—Woman's Auxiliary to the American Medical Association. See page 743, issue of April 2.

**June 8-14**—International Hospital Congress. See page 521, issue of March 5.

**June 9**—Medical Veterans Meeting. See page 895, issue of April 23.

**June 9**—The Scientific Session of the American Heart Association. See page 742, issue of April 2.

**June 16-19**—Catholic Hospital Association. See page 690, issue of March 26.

**July 6-11**—Medical Clinic, Paris. See page 520, issue of March 5.

**July 26-31**—Third Congress of the Pan American Medical Association. See page 632, issue of March 19.

**July 27**—The Post Graduate Course of Ear, Nose and Throat Surgery at the University of Bordeaux, France. See page 951, issue of April 30.

**July 27-31**—Third International Congress of Radiology, Paris. See page 789, issue of April 9.

**Aug. 31 - Sept. 4** — Neurologists will meet in Berne, Switzerland. See page 896, issue of April 23.

**September 14-17**—The American Public Health Association. See page 632, issue of March 19.

### DISTRICT MEDICAL SOCIETIES

**Bristol North District Medical Society**

**September 17**—Details to be announced.

**Essex North District Medical Society**

**Next meeting: Amesbury Country Club, Amesbury, May 13, 1931; dinner at 12.30. Speakers, Wm. H. Ross, President, New York State Medical Society, "A Medical Society's Public Relations Committee at Work." Discussion. Non-residents invited to hear the discourse. (Dinner optional at cost to Society.)**

**Essex South District Medical Society**

**Tuesday, May 12**—See page 690, issue of March 26.

**Franklin District Medical Society**

**May**—The meeting will be held on May 12 at 11 A. M. at the Weldon Hotel, Greenfield.

**Middlesex East District Medical Society**

**May 13**—At Wakefield.

**Plymouth District Medical Society**

**May 21**—See page 1011.

**July 17**—Midsummer meeting. See page 1011.

## BOOK REVIEWS

*The Gynecological Seminar.* By DR. WILHELM LIEPMANN, Berlin. Das gynäkologische Seminar. Berlin and Vienna, Urban & Schwarzenberg, 1931.

This volume presents in a series of chapters corresponding to fifteen lectures, a course in Practical Gynecology with special reference to some of its social aspects, the chapters averaging about 20 pp. each. It is well and abundantly illustrated with 305 text figures, some in several colors and with twenty-four full-page plates. It is intended to supplement the author's similar volume on Obstetrics.

Two chapters are devoted to social gynecology in which special interest attaches to the paragraphs on Birth Control and Contraception. One statement which arrests attention and furnishes food for thought is that "Poland with 30,000,000 inhabitants has today 430,000 infants while Germany with 60,000,000 inhabitants has only 405,000 infants." The author points to the grave dangers which threaten the German race from its persistent decline in fertility.

*Modern Methods of Treatment.* By LOGAN CLENDENING, M.D. 4th Edition. 819 pages. Published by C. V. Mosby Co., St. Louis, 1931. Price $10.00.

The fourth edition of the textbook on modern therapeutics by Clendening unquestionably accomplishes its purpose, namely that of presenting in detail, primarily for the general practitioner, the methods of treatment that are at present practiced in modern medicine. The various procedures such as dietetics, hydrotherapy, psychotherapy, etc., are correlated and incorporated into a single volume with the purpose of saving the general practitioner the arduousness of delving into tomes, any one of which may be devoted to a particular one of the above subjects. A comparatively rapidly approachable and satisfactory reference source is thus provided.

The work in most respects is up-to-date and includes, for example, Harrington's work on the chemistry of thyroid principle, the use of desiccated swine stomach in pernicious anemia, the employment of salyrgen and Calmette's BCG tuberculin. However, the contents emphasize the fact that an up-to-the-minute detailed and complete therapeutic procedure in a particular disease must be looked for elsewhere, in monographs or in periodicals dealing with that particular disease or its allied disorders. For instance the author states that pneumothorax must be employed only in the advanced case of tuberculosis and that patients suitable for this form of therapy are those that have the prospect of a fatal issue. The preceding is apparently at variance with the commonly accepted belief of those here and abroad applying this procedure that the indication for its use is the presence of a caseating lesion (without pleural adhesions) as determined by x-ray of the lung. The factor of eventual outcome is evidently disregarded by the latter. The author's description of the treatment of such an important disease as syphilis in no way coincides with that advocated and practiced by the average dermatologist or syphilographer. An inadequate course of 6 to 10 injections with mercury inunctions is administered to a case of early (primary) syphilis and all further treatment discontinued if the Wassermann test is negative. No mention is made of the intramuscular employment of bismuth as an adjunct to the arsphenamines in these cases. Mention is made of a so-called treatment of congenital syphilis, namely that of introducing arsphenamine into the longitudinal sinus, a procedure which is absolutely prohibitory and to be avoided at all cost. Nothing appears regarding the universally practiced method of treating this aspect of syphilis with intramuscular injections of neo, preferably sulpharsphenamine with or followed by bismuth. Under the treatment of central nervous system syphilis, there appear descriptions of such severe, useless and discarded methods as the Swift-Ellis and its modifications, the Ogilvie and the Byrne.

However, disregarding the relatively rare occasional lapse exemplified by the preceding remarks the book is of undoubted value to the specialist since it contains a sufficient amount of enlightenment regarding the essential therapeutic procedures pursued in fields other than his own. To the practitioner it is recommended for the very excellent and adequate description of the material and methods that are perforce a part of his daily routine.

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*The History of Paediatrics.* By GEORGE FREDERIC STILL, M.A., M.D. (Cantab.), Hon. LL.D. (Edin.), F.R.C.P. (London). Oxford University Press, London: Humphrey Milford, 1931. Price $8.00.

No person should consider himself entirely conversant with his profession who knows nothing of its past and cannot reflect soberly on its future. The byways of medical history, fascinating as they are, have still their practical uses for they lead deviously into the broad highway of modern science upon which we are all traveling.

Dr. Still does not need to apologize for this first history of paediatrics written by an Englishman, the outgrowth of his Fitzpatrick Lectures on Medical History, although we in this country are pleased with his acknowledgment of a preceding work—Pediatrics of the Past—by Dr. John Ruhräh, of Baltimore. The subject is broad enough for more than one to write upon, and a different viewpoint broadens it still more.

The early writings on Paediatrics are a casual part of medical literature as a whole, for until comparatively recent times Paediatrics, of course, was not a separate branch of Medicine. Its beginnings occur in the Graeco-Roman period, many of the aphorisms of Hippocrates having to do with the diseases of children. There is no evidence, however, that the Hippocratic writings contain any section devoted exclusively to the diseases of children. The same applies to the Arabian School. Paediatrics was not a specialized branch of medicine but received its due recognition in the writings of the great Arabians where thoughtfulness and common sense are found. Thus, about the year 1000, we find Avecinna (Ibn Sina) writing: "In his waking time put him in the light that he may see the stars and sky, and shew him sometimes various colours that so you may accustom him to the use of his eyes. . . . Speak to him with a loud voice while you are looking after him so that you may accustom him to speech."

After the Arabians and until the Renaissance no one left behind him a name as a writer on paediatrics. In the fifteenth century, however, with the invention of printing, the revival of learning in medicine really began. Here we have Bagellardo and Tolet, Metlinger and Roelans, and in 1429 the earliest doggerel poem on the care of children. There was still hardly any science to paediatrics, as witness Leonellus Faventinus on oregmon, or mouth-breathing: "Oregmon occurs in infants as the result of a fine watery phlegm, with a touch of viscosity in it; the air coming in contact with this becomes overheated and causes this particular sound in the heart."

The first English work on diseases of children ap-

peared in 1545; it was by Thomas Phaer, "a name to be remembered and had in honour by all those who are interested in the progress of the care of the sick child in this country". Over a hundred years elapsed before another appeared and then, in 1653, in the midst of a busy practice, "at rapt hours" snatched from his daily work, Robert Pemell of Cranebrooke in Kent published "De Morbis Puerorum, or a Treatise of the Diseases of Children," apologizing for having written it in the mother tongue.

The names crowd fast upon one another, with certain ones standing out above the rest; Francois Glisson; Sylvius; the incomparable Sydenham; Boerhaave; Cadogan; Fothergill; Patrick Blair, who described congenital hypertrophy of the pylorus in 1717, anticipating Hezekiah Beardsley by seventy-one years; Rosen von Rosenstein; Heberden; Jenner.

It is a fascinating anthology, rendered more fascinating by the excellent biographical sketches.

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*The Surgical Clinics of North America.* Chicago Number. February, 1931. Volume 11, Number 1. W. B. Saunders Company, Philadelphia.

Bevan opens this number with an excellent review of the general principles involved in the operation of laparotomy. This covers the history, examination, preparation for operation, anesthesia, types of incisions, drainage, postoperative treatment, and complications. In brief, this is a remarkably comprehensive yet concise survey of proven principles in abdominal surgery.

In his article an aerocele of the scrotum Speed discusses the general problems of subcutaneous emphysema and presents an interesting case report of this condition following a small puncture of the rectum, as one of several severe injuries sustained in an automobile accident.

Vernon David believes that malignancy in linitis plastica of the stomach is the general rule, and that more careful observation will eventually reveal metastases in nearly every case.

The principles and technic of treating varicose veins by the injection method are very ably demonstrated by Theis.

A discussion of the neuralgias of the cranial nerves is presented by Bailey. Case histories are used to illustrate the various conditions and their treatment. For trigeminal neuralgia he uses not only alcohol injections and the temporal Gasserian ganglion operations, but occasionally uses a suboccipital approach to divide the fifth nerve at the base of the brain as suggested by Dandy. A similar operation is used for glossopharyngeal neuralgia. Postherpetic neuralgia is not susceptible to surgical relief.

Many unusual cases are reported in this number. Among these are a case of carcinoma of the bladder cured by erysipelas by Nadeau, acute cholecystitis in an eleven year old boy, and gastrojejunocolic fistula by Gatewood; enormous retroperitoneal lipoma by Andrews; temporosphenoidal abscess by Hayden; dislocation of the hip with fracture of the acetabulum by Christopher; megacolon of great capacity; and Leiomyoma of the uterus with sarcomatous degeneration by MacKechnie and Olson; and sarcoma of the femur with involvement of the knee joint simulating arthritis, by Compere.

Vincent J. O'Connor gives a valuable clinic on functional incontinence of urine in women. His technic is a modification of the Kelly operation in which he uses a Young prostatic tractor to push the bladder floor downward and forward. His results have been excellent.

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*Quelques Dermatoses Communes De L'Enfance.* By Dr. A. Boutelier. Gauthier-Villars et Cie, Editeurs, Paris, 1930.

As the author states, this little book considers only some of the most common skin diseases appearing in children. The French text is very readable and affords excellent practice in reading medical French. The plates are well chosen and all are copies of moulages in the Museum of the Saint Louis Hospital.

The subject matter is grouped in five chapters. Urticaria, the prurigos and eczema comprise the first group, and occupy more than one-third of the book. The pyodermias, including the staphylococcus and streptococcus affections of childhood, are covered very well in the second group. Bullous eruptions are reviewed in the third chapter, with proper emphasis on the varying opinions of so-called epidemic pemphigus. Scabies is considered to be of sufficient importance to form a separate chapter. This is the least satisfactory portion of the book. The final chapter on the affections of the scalp is an excellent one. It is unfortunate that more of our textbooks are not arranged in this careful, detailed manner, with adequate headings and subheadings, and with this well chosen arrangement of types.

The book as a whole expresses a very modern and up-to-date viewpoint and has many prescriptions with detailed advice on treatment.

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*Medical Jurisprudence.* By Elmer D. Brothers, B.S., LL.B. Third Edition. Published by the C. V. Mosby Company, St. Louis, 1930. 292 Pages. Price $3.50.

"Medical Jurisprudence" is essentially a summary of legal rulings and court decisions which bear upon the relationship of physicians to Courts of law, patients and the public. In the words of the author, Medical Jurisprudence is "the science which treats of the application of medical and surgical knowledge and skill to the principles and administration of the law. It comprises all legal subjects which have a medical aspect, and all medical subjects which have a legal aspect."

The book itself deals briefly with Courts and Procedure, Evidence, the Expert Witness, License, Contractual Relations, Agreement for Surgical Operation, Malpractice, Insanity, Wounds, Blood Stains, Crimes with Medical Aspects, and other phases of medical jurisprudence. It is written by a lawyer, in language which at times is a bit too legal for the average medical man to follow easily, but in the main

the points are well and clearly brought out. Most of the conclusions are familiar to medical men of experience, but for the medical student the book should have distinct value in helping him to orient himself in a society which is based upon legal rights and obligations. For the older practitioner, it should be helpful as a book to which he may refer when faced by an unusual medicolegal situation.

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*The Clinical Interpretation of Blood Examinations.* By Robert A. Kilduffe. Lea & Febiger, Philadelphia, 1931. Pp. 629, 60 illustrations. Price $6.50.

This book, well written, quite complete, illustrated with sixty engravings, many charts and tables, is a veritable mine of information on the clinical significance of laboratory examination of the blood. The thirteen chapters include sections on "The Physical Properties of Blood," "Blood Formation and Blood Destruction," "Cytological Blood Examinations," "Clinical Study of the Cellular Elements of the Blood," "The Leukocytes," "The Blood Platelets," "The Symptomatic Blood Picture in Disease," "The Laboratory Study of Anemias," "Bacteriological Examinations of the Blood," "Serological Blood Examinations," "The Parasitology of the Blood," "Complement-Fixation Tests," and a final chapter is devoted to the "Chemical Examination of the Blood." The book does not give any directions for making these examinations but is devoted solely to a discussion, with voluminous references to the literature, of the clinical and physiological conditions in which the blood examinations are abnormal. There is an excellent section on the erythrocyte sedimentation test and a summary of the work on serological tests of the blood in malignancy, tuberculosis, etc. The author discusses at length the complement-fixation tests, but is rather loathe to see much that is good in the newer precipitin reactions for syphilis, insisting that they have not proved themselves.

Parts of the book are of interest only from an historical point of view. An example of this is seen in the section entitled, "The Laboratory Diagnosis of Pregnancy." There is here no mention of the more recent Aschheim-Zondek test, which has made obsolete all of the former unsatisfactory methods. In spite of this minor drawback, there is very little fault to be found with the volume; the paper is good, the printing clear, and there is a complete index. It really should be considered more as a textbook on the pathological physiology and chemistry of the blood than a simple discussion of the significance of the numerous blood examinations which the title seems to indicate. For the internist, surgeon, clinical pathologist, and even for those devoting themselves to research, it would prove itself an excellent book of reference.

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*Selections from The Papers and Speeches of John Chalmers DaCosta.* Published by W. B. Saunders Co. Price $6.50.

While it is true that whatever a man writes shows something of himself, most of us have a natural desire to know more about leading practitioners of the healing art than is apparent in their technical writings. So this reprinting in one volume under the title of "Selections from the Papers and Speeches of John Chalmers DaCosta" is to some a welcome occasion for renewing acquaintance with an old friend and to others the opportunity to make the acquaintance of a vigorous and charming personality. Of his distinguished work as a surgeon and as a teacher of surgery, but a few suggestions appear.

DaCosta has more than a touch of whimsicality, illustrated by his sentence "Some of my papers have not been used in this book," which reminds one of Robinson Crusoe's (not Defoe's) explanation to Davy, of his immoderate laughter at the Hole Keeper's letter: "He has left out the greatest lot of amusing things you can imagine." One gets the impression of very much more than DaCosta might have said if he had had a mind to say it. The biographical sketches are of Baron Larrey; Crawford W. Long; S. D. and S. W. Gross; W. W. Keen and George McClellan, the founder of Jefferson Medical College. The historical papers make one eager to learn more of the past of medicine. Two of the "literary essays", "Dickens' Doctors" and the "Personal Side of Pepys" are among the most diverting. For the younger physician the "Trials and Triumphs of the Surgeon," "The Surgeon, the Patient and the Clinical Diagnosis," "Behind Office Doors," and "Certain Tendencies in Medicine," deal with matters of perennial interest.

DaCosta's sharp tongue and nimble wit sometimes lead him to the clever rather than to the wise, but there is wisdom in the book and a fine idealism and a scorn for what he thinks is less than the highest and best in medicine make the material worthy of republishing in its present form. Although the papers show considerable inequality in merit, the book as a whole is to be strongly commended, especially to the young surgeon, and one closes it with a sigh of regret that there are not more physicians among us who have the gift of literary expression; or is it because physicians are finding so little in their lives that is worth while expressing? There is a graceful dedication to Harvey Cushing.

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*An Introduction to Practical Bacteriology.* By T. J. Mackie, M.D., D.P.H., and J. E. McCartney, M.D., D.Sc. Published by William Wood & Company, New York and E. & S. Livingstone, Edinburgh, 1931. Third Edition. Pp. 421. Price $3.50.

This volume is small in size and aims to cover only the fundamentals of bacteriology and immunity. That it is planned for students with but little training is evidenced by the inclusion of a twenty-two page section on the use of the microscope. Directions are given for the preparation of a few types of culture media, and for the most commonly used staining methods. The various important pathogenic microorganisms are considered fairly adequately. Immunology, however, is treated in very sketchy fashion, as would be expected in a book which plans to be only an introduction to practical bacteriology.

*The Inborn Factors In Disease: An Essay.* By ARCHIBALD E. GARROD. Oxford: Clarendon Press, 1931. 160 pages. Price $2.75.

This small volume covers the subject of the basic principles of predisposition to disease, as well as an analysis of the different types of predisposition, from the modern point of view. Some new light has been thrown upon this complicated subject by the study of groups of patients, by analysis of their metabolism or blood chemistry. The whole subject is still extremely complicated and although Garrod's analysis is helpful, little is added to our knowledge. The book is pleasingly written and is a scholarly contribution.

*Studies from the Rockefeller Institute for Medical Research.* Reprints. Volume 72. Published by the Rockefeller Institute for Medical Research. New York, 1930.

This five hundred and ninety page volume of reprints from the Rockefeller Institute deals with the usual wide range of subjects. Of much interest to practitioners is the review of serum treatment in type I lobar pneumonia by Rufus Cole.

*Facts and Figures About Tuberculosis.* Compiled by JESSAMINE S. WHITNEY. (Pub.—National Tuberculosis Association, 450 Seventh Avenue, N. Y. C.) Price 75c.

Miss Whitney has done a very real service in combining in brief form such a mass of information as is found in Facts and Figures About Tuberculosis. The tables and charts are clear and easy to read and, what is of more importance, to understand. Some of the facts brought out are so striking as to bear emphasis. For instance, the average person—and indeed the average physician—is apt to feel that tuberculosis as a cause of death has gone rather into the background, being preceded by nephritis, heart disease, cancer, etc., but as a matter of fact 62 per cent. of all tuberculosis deaths occur between the ages of 15-45 years,—the period of man's greatest usefulness, while the others I have mentioned take their toll in age periods around 70. Likewise, there has been a curious change in the mortality from this disease among men and women. Prior to 1915 the tuberculosis death rate among young women, 20-24, was less than that among young men, while at the present time it is so much more as to merit serious study. Also, the death rate among negroes is 2½ times that among whites.

The chapter on Occupations gives much important information. Perhaps the most important chapter is that on Tuberculous Infection. As a result of the children studied by Dr. Chadwick and his co-workers in Massachusetts it was found that 34 per cent. of children up to 14 years were infected with tuberculosis, whereas the same group in Philadelphia showed nearly 75 per cent. to react positively, and in New York City a large group showed 64 per cent. of reactors, while the work of McCain in North Carolina among both white and colored showed 22 per cent. to 27 per cent. respectively. These figures are of very real interest.

In Chapter X on the Organization Against Tuberculosis it is stated that there is a law in every state requiring physicians to report cases of tuberculosis to the local health board or health officer. In a personal communication within the past two months from two eminent specialists in North Carolina each one told me that there was no law in that state requiring the reporting of tuberculosis. It is evident that somebody is wrong. In the chapter on Sanatoria there are some curious omissions. It states that the Channing Home in Brookline opened in 1857 was the first institution for the treatment of tuberculosis in this country. No mention is made of the Sharon Sanatorium opened in 1898, the first real sanatorium in this country to be established practically at the seacoast or at least at sea level, and no mention is made of the Rutland State Sanatorium in Massachusetts, which was the first state sanatorium in this country. The striking results from the sale of Christmas seals are shown in a chart most graphically.

This book is of the greatest interest and value.

## BOOKS RECEIVED FOR REVIEW

*White House Conference 1930.* Addresses and Abstracts of Committee Reports. Prepared by the White House Conference on Child Health and Protection. Published by The Century Company. 365 Pages.

*Transactions of the American Association of Genito-Urinary Surgeons.* Vol. XXIII. Published by The Bruce Publishing Company. 463 Pages.

*Studies from The Rockefeller Institute for Medical Research.* Volume 75. Published by The Rockefeller Institute for Medical Research. 619 Pages.

*Discovering Ourselves—A View of the Human Mind and How It Works* by Edward A. Strecker and Kenneth E. Appel. Published by The Macmillan Company. 306 Pages. Price $3.00.

*The Diagnosis and Treatment of Brain Tumors* by Ernest Sachs. Published by the C. V. Mosby Company. 396 Pages. Price $10.00.

*The Vitamins* by H. C. Sherman and S. L. Smith. Second Edition. Published by The Chemical Catalog Company, Inc. 575 Pages. Price $6.00.

*Crippled Children—Their Treatment and Orthopedic Nursing* by Earl D. McBride. Published by the C. V. Mosby Company. 280 Pages. Price $3.50.

*The Common Sense of Drinking* by Richard R. Peabody. Published by Little, Brown, and Company. 191 Pages. Price $2.00.

*Collected Papers 1904-1929* by Edwin Beer. Published by Paul B. Hoeber Inc. 827 Pages. Price $7.50.

*Surgery—Its Principles and Practice for Students and Practitioners* by Astley Paston Cooper Ashhurst. Fourth Edition. Published by Lea & Febiger. 1189 Pages. Price $10.00.

*The Physician of the Dance of Death* by Aldred Scott Warthin. Published by Paul B. Hoeber Inc. 142 Pages. Price $7.50.

*Hemorrhoids—The Injection Treatment and Pruritus Ani* by Lawrence Goldbacher. Second Edition. Published by F. A. Davis Company. 207 Pages. Price $3.50.